

PROCESSING OPERATIONS CONTROL OMI PLANNING SHEET



Wad Number S6444-J01-R01	SITE LCC	Elem CD V	End Item 103 FLT: 030	DATE: 06/28/2001 TIME: 09:04:27
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Title: SSV ICE AND DEBRIS ASSESSMENT	Sub Element/Zone 30
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Project Work Order No.	Hazard: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	SFOC Safety N/A TOTAL BOOK	WC 150 USA	<input type="checkbox"/> Local Copy
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Authorizing Document ORB330	Material & Equipment: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	MICR Req'd <input type="checkbox"/> Yes <input type="checkbox"/> No	JUL 11 '01	OMRS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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PERFORM THE FOLLOWING:

Pre-Ops Setups							
Task	Operation Number	Seq	Steps	Task	Operation Number	Seq	Steps

CVAS	TIPS	ME	TACGS
900 WA VSN	N/A USA VM 046	900 WA VSN	990 WA VSN USA VM 031

OPS Support							
Task	Operation Number	Seq	Steps	Task	Operation Number	Seq	Steps

Operating instructions						
Task	Seq	Steps	Task	Seq	Steps	
	010			090		
	020			100		
	030			110		
	040			120		
	050			130		
	060			140		
	070					
	080					

Post Ops				Appendices	
Task	Operation Number	Seq	Steps	Task	Seq
				N/A	

Subtask WAD's
N/A

Planner LISA RUTKOWSKI	WC 150 USA JUL 11 '01	Ext 0746	QC Closure	Date AUG 22 '01	Page 1 OF 1
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AND REVIEW
SPC 764
AUG 22 01

USA VM 047

USA VM VSN

USA VM VSN

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SSV ICE AND DEBRIS ASSESSMENT

Element/End Item: ALL
Flow/Usage: ET-103 & SUBS
Facility: LC 39
Design Center Concurrence: MSFC/JSC
Category: B
OPR: ETM
TTL ORG: SE

**This document contains
HAZARDOUS operations.**

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1.0 INFORMATION

1.1 Objective

Provide necessary tasks that document, monitor and evaluate ice and debris conditions to eliminate or minimize debris concerns of the integrated SSV during ET tanking, FRF, launch, and associated detanking.

Description

1. This OMI is performed as subtask to S0007/S0014/S0037.
2. This OMI provides documentation of ice/debris activities:
 - A. Pre-launch icing briefing
 - B. Pre-launch debris inspection
 - C. Countdown - Based timeline evaluation monitoring of ET TPS surfaces using OTV
 - D. OTV monitoring of seal/flange areas for cryogenic leakage
 - E. SSV OTV monitoring for debris conditions during countdown
 - F. Cryogenic replenish inspection for evaluation of SSV and facility debris concerns or anomalies
 - G. Evaluation of concerns/anomalies in the event of ET detanking
 - H. Review of engineering film data for SSME ignition, launch, ascent, ET separation, and orbiter landing.
3. Orbiter landing debris information is contained in the NASA publication for Ice and Debris Assessment. That report is referenced in this OMI for continuity of debris data.

1.2 Special Instructions All Operations

1. This OMI is run as a subtask to OMI's S0007, S0014, and S0037. All PAD clearing and controlled access operations will be performed per those OMI's.
2. Constraints will be statused by controlling OMI's S0007/S0014/S0037.
3. The OTV camera numbering scheme for PAD A/B is 0XX/1XX.
4. Task Team Leader assignment: NASA PH-H is TTL for L-20 Hour Walkdown, Final Inspection, and Post Launch/Drain Walkdown. ETM is TTL for all other operations.
5. From time stable replenish mode starts until start of final SCAN, scanning with individual cameras should be performed approximately once per hour.
6. Cameras 061/161, 063/163, and 070/170 may be released to NASA select with CICE concurrence.
7. All personnel participating in final inspection and post drain walkdown shall be current in following training:
 - A. Emergency PAD egress
 - B. Fire fighting
 - C. ELSA
8. Milestones:
 - A. MLP portion of post launch walkdown commences at approximately T + 1 hours.
 - B. PAD acreage portion of the post launch walkdown commences at approximately T + 2 hours. (may be deferred until preferred daylight hours.)
 - C. Post drain walkdown commences at approximately T + 4 hours after drain initiated (typically 1 1/2 hours after LH₂/LO₂ low level sensors dry).
9. Hands-on investigation required for all ET-TPS defects suspected of violating NSTS 08303 ice/debris inspection criteria.

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10. From time launch scrub is declared until 1.5 hours past time LH₂/LO₂ low level sensors read dry, OTV camera scanning shall be performed approximately once per hour.
11. OTV cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171 shall be used to monitor LO₂/LH₂ tank drain operations.
12. Excessive vapors are defined as being more severe than that described in NSTS 08303 - Ice/Debris Inspection Criteria or NSTS 16007 - Launch Commit Criteria - Hazardous Gas Subsystem.
13. Quality coverage is not required for performance of this OMI. Ref SFOC-GO0007, Ice and Debris Team Operations are exempt from quality coverage. The ROR (CTIF) performs the CMQC function for all non-hazardous operations.
14. Personnel using Sony DKC-ID1 camera shall verify lithium ion battery is securely locked in the bayonet fitting and the lithium button battery door is securely locked and taped in place.
15. Verify camera flash is deactivated.
16. Personnel using Kodak DC 50/120 camera shall verify alkaline batteries are properly installed.
17. Personnel using digital cameras shall not operate in H₂ leak or O₂ rich environment (23 percent or greater).
18. Personnel using the Sony MVC-FD91 camera shall verify the lithium ion battery is securely locked and the battery door is locked closed. Personnel shall verify that both battery doors (lithium ion and lithium button) are closed and taped shut.
19. Personnel shall verify that cameras and equipment are securely tethered when at the PAD while the SSV is present.

1.3 Operations List

Operation		Shop/ Cntl Rm Console	OPR	Haz (Y/N)	Duration (Hrs)
No.	Title				
10	Support Preparations	STM/ FR2	ETM	N	0.2
20	Ice Prediction Briefing	SE/ NA	ETM	N	0.5
30	Pre-launch Walkdown	SE/ NA	ETM	N	2.0
40	Ice Frost Debris Console Initial Configuration Setup	SE/ FR2	ETM	N	3.0
50	SSV Debris Assessment	SE/ FR2	ETM	N	18.0
60	Group 1 Monitoring LO2 Chill Down Thru T-0	SE/ FR2	ETM	N	15.0
70	Group 2 Monitoring - LH2 Chill Down Thru T-0	SE/ FR2	ETM	N	15.0
80	Final Inspection	SE/ FR2	ETM	Y	3.0
90	LO2/LH2 Drain Monitoring	SE/ FR2	ETM	N	4.0
100	Console Securing	SE/ FR2	ETM	N	0.5
110	Summary Tape	SE/ FR2	ETM	N	18.0
120	Post Drain Walkdown	SE/ NA	ETM	Y	2.0
130	Post Launch Walkdown	SE/ NA	ETM	Y	3.0
140	Film Review	SE/ NA	ETM	N	15.0
150	Final Report	SE/ NA	ETM	N	0.5

2.0 SAFETY INFORMATION

2.1 Hazards

Operation

1. Working at unprotected heights.
2. Walkdown at PAD while SSV is in stable replenish mode.

2.2 Safety Requirements

Operation

1. If lightning activity is forecast to be within 5 miles of launch PAD, CTC and SFOC safety shall implement provisions of adverse/severe weather and lightning policy contained in GSOP 5400 Ground Safety Operations Procedures.
2. There are no safing/shutdown or evacuation steps required in this OMI.
3. Hazardous operations within this subtask OMI will not be started until safety concurrence to proceed has been given per the integrated OMI controlling this subtask.

2.4 Reference Safety Documentation

Number	Rev	Title
KHB 1710.2	LI	KSC Safety Practices Handbook
GSOP 5400	LI	Ground Safety Operating Procedure

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3.0 STAGING REQUIREMENTS

3.1 Referenced Engineering Documentation

3.1.2 Documents

OPERATION 120

Document No.	Rev	Title
NSTS 08303	(LI)	NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA

3.2 Parts, Materials, Equipment, and Special Tools

3.2.8 Personal Protective Equipment

OPERATION 30	Nomenclature safety harness lanyard
OPERATION 80	Nomenclature safety harness lanyard Nomex coveralls with gloves and hoods ELSA
OPERATION 120	Nomenclature safety harness lanyard hardhats flame retardant coveralls
OPERATION 130	Nomenclature safety harness lanyard hardhats flame retardant coveralls

4.0 PLANNING REQUIREMENTS

OIR Required Yes [], No [X]

4.3 LPS Requirements

4.3.1 Computer Systems

PC GOAL
CCMS Configuration
CDS
CMS

GSE Links/HIMs

Link	FEP	Location	HIM	Octal Addr	Function
------	-----	----------	-----	------------	----------

DPS Configuration

OPS Mode - ____
Dedicated DEU/DDU - ____

Vehicle Links and Formats

Link	FEP	Freq	Downlink	Downlist
------	-----	------	----------	----------

Control Room Consoles Required

SDC/RTIF Configuration

RPS Configuration

Link	Freq	Element	Downlink Format
------	------	---------	-----------------

ESA monitors/hot spares

CCS Configuration

Link	FEP	Location	HIM	Octal Addr	Function
------	-----	----------	-----	------------	----------

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CCS Consoles Required

4.4 Support Services, Commodities, and Equipment

4.4.2 Communications

(Per controlling OMI S0007, S0014 or S0037)

Voice Recording:

Radio nets:

Paging:

Area warning:

Portable radios (loan pool):

<u>Type</u>	<u>Qty</u>	<u>Net/Freq</u>	<u>Record</u>	<u>Duration/Purpose</u>
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Portable OIS units:

Special communications:

4.4.3 OTV

(Per controlling OMI S0007, S0014 or S0037)

OTV Cameras required: 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171

OTV Cameras to be recorded: 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171

OTV Monitor:

Special OTV requirements:

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4.4.4 Countdown Display/Status

<u>Display Required</u>	<u>Bldg</u>	<u>Room</u>	<u>Operation Time</u>
Timing	LCC	FR2	Duration of Test
Countdown and GMT	LCC	FR2	Duration of Test

4.4.8 Services

<u>Service/Special Requirements</u>	<u>Location</u>	<u>Purpose</u>
SFOC Safety	LC-39 A&B	Safety Support
ELSA'S (8)	LC-39 A&B	Inspection Team Use
Radio Net 105	LC-39 A&B	Inspection Team Use

4.4.12 Propellants, Gases and Chemicals

<u>Commodity</u>	<u>Spec No.</u>	<u>Quantity</u>	<u>Rcvr</u>	<u>Location</u>	<u>Minimum Press</u>	<u>Delivery Time</u>
GN ₂	SES-0073 -6.3-5	Min 750 Cu ft	PH-H 861-3645	Pad 39B Camera Site 2	3000 PSI	1 week prior to T-0

5.0 CONFIGURATION ACCOUNTING AND VERIFICATION

5.1 Specific OMRS Requirements Satisfied by this TOP

OMRS NO.	NOMENCLATURE/ EFFECTIVITY	SEQ-STEP (CAP)
S00E00.021	ET TPS MON DURING DETANK TAF;C	90-005
S00E00.031	POST DETANK ET TPS INSPECT TAF;C	120-002
S00FA0.900	PRELAUNCH WEATHER BRIEFING (L-1 DAY) VAF1-90	20-001
S00FB0.005 (1)	ET TPS SURFACE MONITORING T23,27-29,31-999	60-012 70-012
S00FB0.350 (1)	MONITOR GO2 VENT HOOD VAF1-90	50-021
S00FB0.360 (1)	MONITOR ET/ORB MPS FOR LEAKAGE VAF1-90	70-012
S00L00.150	HIGH WIND ET NOSE INSPECTION SAF;C	50-018 60-012
S00U00.010 (1)	POST LAUNCH SHUTTLE/PAD AREA INSPECTION SAF1-999	130-002
S00U00.011 (1)	ENGR REVIEW & ANALYSIS OF LAUNCH FILM SAF1-999	150-002
S00U00.020-A (1)	AN ENGINEERING PAD INSPECTION TEAM SAF1-999	80-002
S00U00.020-C (1)	INSPECT ORBITER AFT ENGINE SAF1-999	80-002
S00U00.020-D (1)	INFRARED SURVEILLANCE SAF1-999	80-002
S00U00.030 (1)	PRELAUNCH SHUTTLE/PAD AREA INSPECTION SAF1-999	30-001

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5.5 List of References

OPERATION 20

Reference No.	Rev	Title
NSTS 16007	(LI)	NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem and Appendix F

OPERATION 30

Reference No.	Rev	Title
80901019010	(LI)	ET Post Build Acceptance and In-Process Rework Requirements Manual - Offsite

OPERATION 40

Reference No.	Rev	Title
79K24576	(LI)	OTV System Installation, LC 39, Pad A
79K24522	(LI)	OTV System Installation, LC 39, Pad B

OPERATION 50

Reference No.	Rev	Title
SPI SP-519	(LI)	OMI and OM Implementation
SFOC GO0007	(LI)	Quality Planning Requirements Document (QPRD)

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OPERATION 10 Support Preparations

Shop: STM
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.2

10-1 STM JYVO 138

Verify PAD OTV system is configured to support S6444 as scheduled.

Support: COMM

10-2 STM JSTC 111
JSTC *SCB 114

Verify eight 10-minute ELSA's available at complex J for use by Final Inspection Team (ref S0007/S0014/S0037).

Support: LS

10-3 STM TBC 136

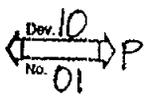
Operation - Support Preparations complete.

*** End of Operation 10 ***

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OPERATION 20 Ice Prediction Briefing

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

NOTE

Ref: NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem and Appendix F defines the ET No-Ice Zone.

20-1 CICE

Conduct L-1 day ice prediction briefing with launch director.

PH-H Signature

Armando Oliva 8/7/01
Armando Oliva - NASA

OMRSD S00FA0.900

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20-2 Operation - Ice Prediction Briefing complete.

*** End of Operation 20 ***

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OPERATION 30 Pre-launch Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD
Hazard (Y/N): N
Duration (Hrs): 2.0

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

NOTE

This operation is performed at approximately L-20 hours. When this operation is performed in support of a 24 hour scrub turnaround, the preceding launch scrub post drain walkdown and this pre-launch walkdown may be performed concurrently.

Inspections may also be performed from the RSS, GO₂ Vent Arm (GVA), -Y OWP, or +Y OWP if still extended and accessible.

Ref: 80901019010 (LI) ET Post Build Acceptance and In-Process Rework Requirements Manual - Offsite

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are optional walkdown participants.

NASA Engr	(4)
SFOC Engr	(2)
LMSSC - LSS	(1)
Boeing - LSS	(1)
SRB ELE	(1)
Thiokol - LSS	(1)

30-1 Debris inspection team **perform** walkdown of SSV and MLP per following:

1. Team leader **verify** S6444 pre-test briefing complete.
2. **Assemble** following essential personnel

NASA PH-H Engineering - 1
SFOC ETM Engineering - 1
3. **Inspect** following areas (as a minimum) from the MLP, RSS and FSS to identify/ resolve potential debris sources.

Areas to be inspected

- A. Launch vehicle external surfaces
 - Orbiter
 - SRB's
 - External Tank
- B. MLP surfaces
 - LH and RH SRB holddown posts
 - Deck including deck bolts, fixtures, and edge gutters
 - SSME LH and RH SRB exhaust openings, and sound suppression (SS) troughs
 - TSM's and camera housings
4. Ref Table 30-1, **document** and SIM Photograph SSV and Launch PAD Configuration.

Description: Pre launch walkdown.

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- 30-2 Record all facility discrepancies in S0007. Submit copy to PAD leader and notify TBC/CTC. Verify no constraints to continue.

PH-H Armando Oliva - Date 3/8/01
Armando Oliva - NASA

ETM Wm Richards II Date 8/9/01
Wm Richards II

- 30-3 Operation - Pre-launch Walkdown complete.

Table 30-1 Photo Requirements for SSV and Launch Pad Configuration			
Photos from MLP			
<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET -Z	Vertical	28 mm	
Aft Dome	Horizontal	28 mm	
Aft Dome	Horizontal	35-70 mm	
LH SRB from North	Horizontal	35-70 mm	All water troughs in view
LH SRB from North	Vertical	35-70 mm	3-4 water troughs in view
LH SRB from East	Vertical	35-70 mm	
RH SRB from North	Horizontal	35-70 mm	All water troughs in view
RH SRB from North	Vertical	35-70 mm	3-4 water troughs in view
RH SRB from West	Vertical	35-70 mm	
SRB Heater Elec T-0	Horizontal	35-70 mm	Foam intrusion; May need flash
North HDP	Vertical	35-70 mm	Representative view
South HDP	Vertical	35-70 mm	Representative view
TSM T-0 LH ₂	Vertical	35-70 mm	Flash needed
TSM T-0 LO ₂	Vertical	35-70 mm	Flash needed
Orbiter Left & Right Wing	Vertical	35-70 mm	From below ET (1 Photo each wing)

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135 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ UMB	Vertical	35-70 mm	From OWP usually during T5401
LH ₂ UMB	Vertical	35-70 mm	From OWP usually during T5401

215 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET surfaces from FSS	Vertical	35-70 mm	
LH SRB Frustrum and FWD skirt	Vertical	35-70 mm	
RH SRB Frustrum and FWD skirt	Vertical	35-70 mm	
Jack Pad C/O's	Horizontal	35-70 mm	Flash needed (1 each C/O)
LO ₂ Ogive Cable Tray	Vertical	35-70 mm	From RSS roof

255 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET surfaces with GO ₂ vent ducts in view	Vertical	35-70 mm	
GO ₂ vent ducts	Horizontal	250 mm	

*** End of Table 30-2 Photo Requirements for SSV and Launch Pad Configuration

*** End of Operation 30 ***

STEP 30-1

STS-105 PRE-LAUNCH PAD DEBRIS INSPECTION REPORT

KSC Debris Team

08 August 2001

The pre-launch inspection of the MLP-3, Pad A FSS and RSS was conducted on 8 August 2001 from 1600 to 1830 hrs EDT. No flight hardware issues/anomalies were detected.

No facility items were documented in Appendix K of S0007VL4. Minor clean-up items were in-work.

The west OWP corrugated sheeting was missing a fastener head on the groove wedge. This was documented on a facility PR (PV-6-377725). However, Debris Team expressed concern that wedge may not be held in place by remaining fastener portion (see attached photos). The decision was made to secure wedge with another fastener. This item was in-work at the conclusion of the Debris Inspection.

Additional Pad work, including prep's for RSS rollback, were in-work at the conclusion of the Debris Inspection.

Armando Oliu, NASA
Robert Speece, NASA

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OPERATION 40 Ice Frost Debris Console Initial Configuration Setup

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 3.0

NOTE

The next step sets up the photo processing laptop for use in the Firing Room. This is not a constraint to set up of the console or to final inspection team operations. Network or equipment failures on the photo processing machine shall be annotated below.

WC 013 USA No. 01 Dev. 40 → *See Dev. 40-1* *ET 01 8/9/01*
~~Connect to KSC ground ops network and **configure** laptop computer to perform photo processing/ analysis.~~

Notes _____

NOTE

The next step verifies the setup of the infrared scanners. This is not a constraint to set up of the ice console. IR scanner condition shall be annotated below.

40-2 Verify IR scanner operation condition, annotate below.

RSS: NOT OPERATIONAL

CS 2: Ready

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NOTE

The next step verifies the operation of console monitors in the Firing Room. This is not a constraint to set up of the console or to final inspection team operations. Equipment condition shall be annotated below.

40-3 Verify console condition by powering on monitors and tape recorders.

Monitors: OK

Tape recorders: OK

NOTE

ET OTV pre-mapping/initial position of cameras may be performed in random order.

Ref: 79K24576 (LI) OTV System Installation, LC 39, Pad A and
Ref: 79K24522 (LI) OTV System Installation, LC 39, Pad B define OTV camera locations.

FOV designates field-of view. RSS and -Y OWP must be retracted for completion of pre-mapping.

Pre-mapping steps/substeps in the remainder of this operation need not be performed if supporting a scrub turnaround and if performed during a previous run.

It is preferred to record all pre-mapping scanning on a single tape. However, multiple tapes may be used when lighting/ launch countdown constraints necessitate such.

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40-4 CVM1 JTV1 223

Perform OTV pre-mapping of External Tank exterior surfaces using OTV Cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, and 067/167 as follows:

- **Insert** designated pre-map tape into trouble console VCR.
- **Punch-up** camera number on trouble monitor.
- **Start** recording on pre-map tape. **Record** start time (GMT).
- **Scan** from top-to-bottom, left-to-right and right-to-left at approximately full zoom-in.
- **Stop** recording on pre-map tape. **Record** stop time (GMT).
- **Record** data in Table 40-1.
- **Repeat** with each OTV camera listed until each has been used to scan the External Tank.
- **Remove** pre-map tape from trouble console VCR.

ETM R Brewer Date 8-09-01

Not Performed: N/A

40-5 CVM1 JTV1 223

Position OTV Cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 070/170, and 071/171 to initial positions as defined in Table 40-2.

ETM R Brewer Date 08-09-01

Not Performed: N/A

Table 40-1 ET Pre-Mapping Data		Tape # 67
OTV	Start Time (GMT)	Stop Time (GMT)
Camera		
004 / 104	10:51	10:59
009 / 109	11:34	11:42
013 / 113	10:43	10:49
033 / 133	11:15	11:22
042 / 142	11:36	11:43
054 / 154	11:29	11:41
055 / 155	11:14	11:23
056 / 156	11:24	11:36
060 / 160	10:33	10:42
061 / 161	10:24	10:35
062 / 162	10:38	10:50
063 / 163	10:46	10:46
064 / 164	11:02	11:18
065 / 165	11:11	11:18
066 / 166	11:22	11:36
067 / 167	10:59	11:08

Notes: Some SUN SPOTS, Some DARK AREAS
NO PROBLEMS

ET
01

8/9/01

Table 40-2 OTV Camera Initial Positions	
OTV Camera	Initial Position
004 / 104	FOV centered on GUCP
009 / 109	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 063/163 and 064/164.
013 / 113	Full zoom in. View SW GO ₂ Vent Louver area.
033 / 133	FOV perpendicular to ET and with LO ₂ -to-Intertank splice at frame top and LH ₂ -to-Intertank splice at frame bottom. Then tilt down until XT2058 is in frame center.
042 / 142	FOV centered on Orbiter Access Arm-to-Orbiter interface.
054 / 154	FOV to encompass approximately 3 feet forward of XT2058 to 2 feet aft of XT2058. Orbiter wing and SRB should be in view at frame left.
055 / 155	Set FOV on north bridge LH ₂ pipeline flange.
056 / 156	FOV with LH ₂ Aft Dome in frame bottom and XT2058 in view at frame top.
060 / 160	Full zoom in. View SW GO ₂ Vent Louver area.
061 / 161	Full zoom-in. Adjust FOV until ET LO ₂ -to-Intertank splice is centered vertically and view is perpendicular to ET. Pan right until edge of the ET comes into view. Note: LO ₂ Tank may pass out-of-view.
062 / 162	Full zoom in. View NW GO ₂ Vent Louver area.
063 / 163	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 009/109 and 064/164.
064 / 164	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 009/109 and 063/163.
065 / 165	Full zoom out. Set FOV on aft part of ET with frame bottom approximately 2 feet below LH ₂ Aft Dome.
066 / 166	FOV perpendicular to ET with LO ₂ -to-Intertank splice at frame top. Then tilt down until Orbiter RH Wing/SRB intersection is in frame lower right.
067 / 167	Set FOV with LH ₂ Aft Dome toward frame bottom and 2 nd black ring of SRB in view.
070 / 170	Select down wind camera of these two as wide angle view of the SSV.
071 / 171	Set up wind camera for close-up view of SSME's.

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

40-6 Operation - Ice Frost Debris Console Initial Configuration Setup complete.

ETM R Brewer Date 08-09-01

*** End of Operation 40 ***

ET
01

8/9/01

40-6

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

OPERATION 50 SSV Debris Assessment

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 18.0

NOTE

Steps in this operation are contingent upon progression of launch countdown operations and may not be performed if countdown is terminated.

Entire Operation Not Performed: N/A

NOTE

Until otherwise indicated, all times are referenced to S0007, S0014 or S0037 timelines.

No operations/steps within this subtask OMI may be performed as a stand-alone procedure. This OMI may only be performed as a subtask to S0007/S0014/S0037.

NOTE

Ref: SPI SP-519 (LI) OMI and OM Implementation and Ref: SFOC GO0007 (LI) Quality Planning Requirements Document (QPRD), following step complies with requirements for ROR-as-CMQC function.

50-1

CTIF TBC
TBC CMQC 136

Notify TBC that CTIF will perform the CMQC function for STS 105, S6444 run 1. Request TBC notify CMQC that the ROR-as-CMQC option will be exercised for STS 105, S6444 run 1.

50-1

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

50-2

CTC	TBC	232
TBC	CTIF	136

Perform OTV and ice/frost monitoring area setups.

ETM R Brewer Date 8-9-01

50-3

CTIF	TBC	136
TBC	CTC	
CTC	STM	232

Verify Operation 10- Support Preparations complete.

ETM Mark Wollan Date 8-9-01

50-4

CTIF

Verify Operation 20 - Ice Prediction Briefing and Operation 30- Pre-launch Walkdown complete.

ETM

ME
08

 Date 8-9-01

ET
01

8/9/01

50-2

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

50-5

CTIF CVM1 222
CVM1 222

Verify:

- All OTV cameras are on, tapes in recorder, and ready to commence OTV scanning, monitoring, and recording.
- Trouble tape recorder is ready.
- Ice Frost Debris Console Initial Configuration Setup complete.

ETM R Brewer Date 8-9-01

50-6

CTIF CICE 222
CVM1
CVM2
CIPC
CTIF JYVR 138
CVM1 JTV1 223
CVM2 JTV2 225

DW
021
AGU

DW
021
x20

All personnel participating in OTV operations report test ready status.

ETM R Brewer Date 8-9-01

Support: COMM

50-3

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

50-7

CTIF TBC 136
TBC CTC 232

Ice Frost Console Area Setups for OTV scanning complete.
Report readiness.

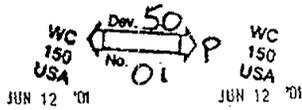
ETM R Brewer Date 8/9/01

Not Performed: N/A

50-8

CTIF CVM1 222

From start of LO₂ chilldown until seal deflation/GO₂ vent hood retraction, **monitor** the +Y/-Y GO₂ vent seal-to-ET interface for seal fretting and continuous GO₂ escape.



OMRS 500FB0.350-1

ETM ME 08 Date 8-9-01

Not Performed: N/A

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

NOTE

GO₂ vent seal fretting could induce damage to ET SOFI. Continuous GO₂ venting could result in formation of ice in the no ice zone (ref NSTS 16007). Ultimate decision to lift the vent hood rests with CMEC.

50-9

CTIF TBC 136
CMEC

If +Y/-Y GO₂ vent seal fretting or continuous GO₂ escape detected from start of LO₂ chilldown until seal deflation, **notify** CMEC for GO₂ vent hood removal.

ETM N/A Date N/A

Not Performed:

ME
OB

8-9-01

50-10

CTIF CIPC 222

Monitor wind speed and direction from start of LO₂/LH₂ chill down through launch/scrub. CIPC **notify** CTIF if winds measured at 38 knots or greater from North +/-30 degrees as measured at 60 feet.

ETM

ME
OB

 Date 8-9-01

Not Performed: N/A

WC
150
USA
JUN 12 '01

Dev. 50
No. 01 P

ET
01

8/9/01
SEE DEV

50-5

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

50-11

CTIF CVM1 222

Perform Operation 60 - Group 1 Monitoring.

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

50-12

CTIF CVM2 222

Perform Operation 70- Group 2 Monitoring.

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

50-13

CTIF CVM2 222

Once per hour minimum, after start of LO₂/LH₂ (until LO₂/LH₂ low level sensors read dry), scan LO₂ feed line brackets and flange closeouts per Table 50-1.

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

50-14

CTIF CICE 222

As count proceeds, for concerns/ observations identified:

1. **Record** observation/concern on trouble tape per Table 50-1.
2. **Document** observed condition on Table 50-2, Observation Worksheet.

ETM

ME
OB

 Date 8-9-01

Not Performed: N/A

50-15

TBC CTIF 136
CTIF CICE 222

Perform Operation 80 - Final Inspection when called by
S0007/S0014/S0037.

ETM

ME
OB

 Date 8-9-01

Not Performed: N/A

50-7

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

NOTE
Final SSV scan typically commences at L-2 hours.

50-16

CTIF CVM1 222
CVM2

Perform final SSV scan.

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

50-17

CTIF CVM1 222
CVM2

At start of T-9 minute hold, **configure** OTV cameras for terminal count.

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

50-18

WC 150 USA
Dev. 50
No. 01
P
JUN 12 '01

If winds are from the north (+/-30 degrees) and are 38 knots or greater: ^(PEAK AS MEASURED AT 60 FEET ABOVE GROUND) OR GREATER.

1. Monitor/videotape nose cone area during high winds.
2. Verify:
 - A. No ice formation on the +Y and -Y GO₂ vent seal footprint areas.
 - B. No damage to the ET TPS at the +Y and -Y GO₂ vent seal footprint areas.
 - C. No damage to the +Y and -Y GO₂ vent seals themselves.
 - D. No evidence of GO₂ leakage from +Y/-Y GO₂ vent seals to ET interface.

USA
VM
067

OMRSD S00L00.150

ETM N/A Date N/A

Not Performed:

ME
08

8-9-01

50-19

CTIF

Verify launch or launch scrub (drain back). Record data.

Launch N/A Scrub X

Date 8-9-01 GMT Time 21:14 ^① GMT
~~X START OF LOK DRAIN~~

Scrub at T- 9 MIN

① EIE

ME
08

8-9-01

WC 150 USA
Dev. 50
No. 01
P
JUN 12 '01

SEE
ET 01
8/9/01
DEV

ETM

ME
08

 Date 8-9-01

50-9

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

NOTE

When completely filled and drain is initiated, it takes approximately 1 hour until the LH₂ tank low level sensors read dry, and approximately 1.5 hours until the LO₂ tank low level sensors read dry.

50-20

CTIF CVM1 222
CVM2

If launch scrubbed (or drain back declared) after start of LO₂/LH₂ slow fill mode:

- Perform Operation 90 - LO₂/LH₂ Drain Monitoring.
- Record observations/concerns on trouble tape per Table 50-1.
- Document all observations/concerns on Table 50-2 Observation Worksheet.

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

50-21 CTIF

GO₂ Vent seal to ET interface monitoring for seal fretting and continuous GO₂ escape complete.

OMRSD S00FB0.350-1

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

50-22

CTIF CVM1 222
CVM2

Terminate scanning operations.

ETM  Date 8-9-01

50-23

CTIF CVM1 222
CVM2

Perform Operation 100 - Console Securing.

ETM  Date 8-9-01

50-24

CTIF

If LO₂/LH₂ tanking started, perform Operation 110 - Summary
Tape.

ETM  Date 8-9-01

Not Performed: N/A

50-11


8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

NOTE
Following step may be not performed at CTIF discretion.

50-25 CTIF TBC 136
 TBC STM

If Post Drain Walkdown to occur at night, **request** PAD xenon lighting be maintained/activated for duration of walkdown.

Not Performed:

ET
01

8/9/01

NOTE
Post drain walkdown typically commences approximately 1.5 hours after LH₂/LO₂ low level sensors read dry.

50-26

CTIF

If launch scrubbed after start of LO₂/LH₂ tanking, **perform** Operation 120 - Post-Drain Walkdown.

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

50-27

CTIF

If launch occurred, **perform** Operation 130 - Post launch Walkdown.

ETM N/A Date N/A

Not Performed:

ME
08

8-9-01

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

50-28

CTIF

If launch occurred, **perform** Operation 140 - Film Review.

ETM N/A Date N/A

Not Performed:

ME
08

8/9/01

50-29

SSV Debris Assessment complete.

50-13

ET
01

8/9/01

Table 50-1 Observation Documentation Procedure

1. CTIF CVM1 222 Locate anomaly/concern on pertinent OTV(s)
CVM2
2. CTIF Punch-up pertinent OTV on trouble monitor.
Update trouble tape log in table below.
3. CTIF Start the trouble tape.

NOTE

Trouble tape shall be allowed to run until sufficient OTV documentation of observation/concern has been made. OK to change OTV's while trouble tape is running.

4. CTIF After observation/concern has been documented on the trouble tape, stop the trouble tape. Update trouble tape log below.

TROUBLE TAPE LOG

Trouble Tape No.	Start Time (GMT)	Stop Time (GMT)	OTV	Description
01	12:58	12:59	68/69	LOUVER ON ⁽⁻¹⁾ 68 PARTIALLY "COVERED"
01	13:54	13:56	54	LOX FEEDLINE SCAN
01	14:55	14:58	54	LOX F/L SCAN
01	15:54	15:56	54	LOX F/L SCAN
01	17:03	17:03	54	LOX F/L SCAN
01	17:55	17:59	54	LOX F/L SCAN
01	18:58	18:59	54	LOX F/L SCAN
01	20:06	20:07	54	LOX F/L SCAN
01	20:48	20:49	54	FROST BALL ON +1 VERT STRUT LH2 AFT DOME INTERFACE
01	21:02	21:04	54	LOX F/L SCAN

ET
01
8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. 2

Observed By: W Richards

Date 8-9-01 Time 16:49 GMT 20:49

Camera No. (or Walkdown) 68

Description:

^{GOX}
~~LOK~~ SEAL APPEARS TO LAP OVER THE VENT

Acceptance Rationale (or IPR/PR No.):

CMEC DATA AND ER SCANS SHOW NO EVIDENCE OF LEAK

FURTHER, FINAL INSPECTION TEAM FOUND NO EVIDENCE OF LEAK.

CICE Armando Oliu Date 8/09/01

CTIF Armando Oliu - NASA Date 8/09/2001

⊙ R. Secor ERM 8/9/01

ET
01
8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. 1

Observed By: W Richards

Date 8-9-01 Time 16:49 GMT 2049

Camera No. (or Walkdown) 54

Description:

FROST BALL ON TY VERTICAL STRUT INTERSECTION
WALK DOWN

Acceptance Rationale (or IPR/PR No.):

ANALOGOUS TO PHOTO 2.2.7 OF NSTS 08303.
ACCEPTABLE

CICE Armando Olin Date 8/09/01

CTIF Armando Olin - NASA Date 8-09-2001

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

N/A

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

ET
01

8/9/01

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N/A

CICE _____ Date _____

CTIF _____ Date _____

ET
01
8/9/01

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N/A

CICE _____ Date _____

CTIF _____ Date _____

ET
01

8/9/01

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N/A

CICE _____ Date _____

CTIF _____ Date _____

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N/A

CICE _____ Date _____

CTIF _____ Date _____

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

_____ N/A

CICE _____ Date _____

CTIF _____ Date _____

*** End of Table 50-2 Observation Worksheet ***

*** End of Operation 50 ***

ET
01
8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

OPERATION 60 Group 1 Monitoring LO₂ Chill Down Thru T-0

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE

Do not perform this operation if launch scrub declared before LO₂ Chill Down commences.

Operation Not Performed: N/A

NOTE

This operation monitors LO₂ Ogive and Barrel and associated components/ areas from start of Chill Down through T-0 via OTV cameras 013/113, 060/160, 061/161, 062/162, 063/163 and 064/164.

OTV cameras 013/113 and/or 062/162 will view -Y GO₂ Vent Hood Seal at all times. At no time will both cameras be positioned away from the -Y GO₂ Vent Hood Seal.

OTV cameras 068/168 and 069/169 view SW and NE GO₂ Vent Areas respectively. These are fixed FOV cameras and do not have pan, tilt, etc. capability.

Steps in this operation are contingent upon progression of launch countdown operations and may be not performed if countdown is terminated.

Noted requirements satisfied by completion of this operation.

~~OMRS S00FB0.005-1-~~

~~OMRS S00L00.150-1-~~

WC
150
USA
JUN 12 '01
Dev. 60
No. 01

ET
01

8/9/01

WC
150
USA JUN 12 '01

ET
01
8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

LO₂ Chill Down To L-2 Hour Mark

60-1 CVM1 JYVR 138

At start of vehicle LO₂ Chill Down, start recorders for cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169.

ETM R Brewer Date 8-9-01

Support: COMM

60-2 Record LO₂ MPS Chill Down start date and time (GMT).

LO₂ MPS Chill Down Date 8/9/01 GMT Time 12:26 GMT

ETM R Brewer Date 8/9/01

60-3 CVM1 JTV1 223

From start of LO₂ Chill Down until start of LO₂ Fast Fill on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169 **monitor/videotape** ET-TPS surfaces. No cryogenic liquid or excessive vapors allowed.

ETM R Brewer Date 8/9/01

Support: COMM

Not Performed: N/A

Div
Set
Date

Div
Set
Date

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

60-4 Record LO₂ Slow Fill start date and time (GMT).

LO₂ Slow Fill Date 08-09-01 GMT Time 12:59 GMT

ETM R Brewer Date 08-09-01

Not Performed: N/A

60-5 Record LO₂ Fast Fill start date and time (GMT).

LO₂ Fast Fill Date 08-09-01 GMT Time 13:12 GMT

ETM R Brewer Date 08-09-01

Not Performed: N/A

60-6 CVM1 JTV1 223

From start of LO₂ Fast Fill until LO₂ stable replenish mode is established, **monitor/videotape** ET-TPS surfaces on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169. **Scan** LO₂ Tank. **Alternate** cameras and **scan** from Intertank to LO₂ Barrel Splice to GO₂ Vent Hood. No cryogenic liquid or excessive vapors allowed.

ETM R Brewer Date 08-09-01

Support: COMM

Not Performed: N/A

60-3

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

60-7 Record LO₂ Topping date and time (GMT).

LO₂ Topping Date 08-09-01 ^① 15:12 GMT Time 15:12 GMT

ETM R Brewer Date 08-09-01

Not Performed: N/A

60-8 Record LO₂ Stable Replenish mode start date and time (GMT).

LO₂ Stable Replenish Date 08-09-01 GMT Time 15:21 GMT

ETM R Brewer Date 08-09-01

Not Performed: N/A

60-9 CVM1 JTV1 223

From time LO₂ Stable Replenish mode is established until time for final SSV scan (approximately L-2 hours), **monitor, scan and videotape** ET-TPS surfaces on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169. No cryogenic liquid or excessive vapors allowed.

ETM R Brewer Date 08-09-01

Support: COMM

Not Performed: N/A

① ERROR -
RB 8-9-01

ET
01
8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Final SSV Inspection Scan

NOTE

Final SSV Inspection Scan should begin not later than 1.5 hours prior to start of T-9 minute hold (approximately L-2 hours) to allow ample time to finish. Final SSV Inspection Scan shall include the ET, SRB's and the Orbiter.

Final scan may be altered or partially performed in the event that time constraints will not permit a complete SSV scan prior to start of T-9 minute hold.

During Final SSV Inspection Scan the camera lights on OTV cameras 061/161 and 062/162 shall be turned "Off" when view passes over the Orbiter cockpit to preclude "distracting" the Flight Crew.

60-10 CVM1 JTV1 223

Perform Final SSV Inspection Scan with OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163 and 064/164. Scan passes shall view entire SSV with cameras at approximate full zoom in during final scan.

ETM R Brewer Date 08-09-01

Not Performed: N/A

ET
01
8/9/01

Terminal Count Camera Positions

NOTE

This step performed for SSME ignition only and may be not performed if launch is scrubbed prior to pick-up of T-9 minute count. Cameras must be positioned for ignition no later than T-9 minutes. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition in an arbitrary order.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for OTV operators to rehearse camera movements.

CVM1 camera positions for SSME ignition are defined in Table 60-1.

60-11 CVM1 JTV1 223

Ref Table 60-1, position cameras 004/104, 013/113, 042/142, 054/154, 060/160, 062/162 for terminal count.

ETM

ME
08

 Date 8-9-01

Support: COMM

Not Performed: N/A

60-12 ~~Completion of this operation satisfies noted OMRS requirements.~~

WC 150 USA
Dev 60
No. 01
P
JUN 12 '01

~~OMRSD S00FB0.005-1~~
~~OMRSD S00L00.150~~

~~ETM~~ _____ Date _____

60-13 Operation - Group 1 Monitoring - LO₂ Chill Down Thru T-0 complete.

ET
01

8/9/01

Table 60-1 CVM1 Camera Positions for Terminal Count

NOTE

This Table defines CVM1 camera positions for terminal countdown. Cameras should be positioned for ignition no later than pick-up of T-9 minutes count. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition non-sequentially.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for operators to rehearse camera movements with ice console.

The GO₂ Vent Arm (GVA) retracts at T-2m30s.

CVM1 Camera Positions Are Defined As Follows:

004/104

GUCP centered in frame so that GUCP will stay in view throughout SRB "twang".

042/142

At approximately T-1 hour, view and monitor Orbiter access arm while Orbiter hatch is being closed.

At T-7m30s, watch Orbiter access arm retract, then view bipod strut in center of frame, LO₂ feedline fairing in top of frame, and Orbiter hatch in right of frame.

054/154

At T-3m50s, view Orbiter right hand body flap movement, then zoom out with Orbiter/ET umbilicals at approximate frame center, Orbiter trailing edge at frame bottom, and edge of +Y (RH) SRB just in view at frame right.

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Table 60-1 CVM1 Camera Positions for Terminal Count

013/113

At T-2m30s, watch lift of GO₂ vent arm for debris and nose cone/vent louvers for ice damage. Immediately following lift of GO₂ vent arm, center frame on GO₂ vent louver and then zoom-out so that entire ET movement is seen during SRB 'twang' at SSME ignition.

060/160

At approximately T-2m30s, after GO₂ vent arm retracts, go full zoom in for a close-up inspection of the GO₂ vent louver. After CICE concurrence, go full zoom out and position camera with SSV centered and ET nose cone at frame top.

062/162

At approximately T-2m30s, after GO₂ vent arm retracts, go full zoom in for a close-up inspection of the -Y GO₂ vent louver. After CICE concurrence, zoom out until ET nose spike is at top of frame with ET centered.

061/161

At approximately T-4m00s, verify camera lights are off. Then position camera to view astronaut closing visor at T-2 minutes 00 seconds.

068/168 and 069/169

Immediately after GO₂ vent hood lift, turn lights off to preclude distracting orbiter crew when the GVA rotates to its latchback position.

***** End of Table 60-1 Camera Positions for Terminal Count *****

***** End of Operation 60 *****

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OPERATION 70 Group 2 Monitoring - LH₂ Chill Down Thru T-0

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE

Do not perform this operation if launch scrub declared before start of LH₂ Chill Down.

Operation Not Performed: N/A

NOTE

This operation monitors LH₂ Barrel and associated components/areas start of LH₂ Chill Down to pre-pressurization via OTV cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167.

Steps in this operation are contingent upon progression of launch countdown operations and may be not performed if countdown is terminated.

Noted requirements satisfied by completion of this operation.

~~OMRS S00FB0.005-1~~

~~OMRS S00FB0.360-1~~

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No. 01
JUN 12 '01

150 USA
JUN 12 '01

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LH₂ Chill Down To L-2 Hour Mark

70-1 CVM2 JYVR 138

At start of LH₂ Chill Down, start recorders for cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167.

ETM R Brewer Date 8/9/01

Support: COMM

70-2 Record LH₂ Chill Down start date and time (GMT).

LH₂ Chill Down Date 8/9/01 Time 12:22 GMT

ETM R Brewer Date 8/9/01

70-3 CVM2 JTV2 225

From start of propellant loading until start of LH₂ Fast Fill on OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167, **monitor/videotape** ET-TPS surfaces. No cryogenic liquid or excessive vapors allowed.

ETM  Date 8-9-01

Support: COMM

Not Performed: N/A



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70-4 Record LH₂ Slow Fill start date and time (GMT).

LH₂ Slow Fill Date 8-9-01 Time 12:32 GMT

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

70-5 Record LH₂ Fast Fill start date and time (GMT).

LH₂ Fast Fill Date 8-9-01 Time 13:09 GMT

ETM

ME
08

 Date 8-9-01

Not Performed: N/A

70-6 CVM2 JTV2 225

From start of LH₂ Fast Fill until stable replenish mode is established, scan LH₂ Tank. Alternate OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167 and scan/videotape from LH₂ Aft Dome to Intertank.

ETM

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08

 Date 8-9-01

Support: COMM

Not Performed: N/A

70-3

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OMI S6444 J01
APPROVED

70-7

Record start date and time (GMT) for LH₂ Topping.

LH₂ Topping Date 8-9-01 Time 14:17 GMT

ETM ME
08 Date 8-9-01

Not Performed: N/A

70-8 Record LH₂ Stable Replenish mode start date and time (GMT).

LH₂ Stable Replenish Date 8/9/01 Time 14:49 GMT

ETM Tom Ford Date 8/9/01

Not Performed: N/A

70-9 CVM2 JTV2 225

During LH₂ Stable Replenish mode and until time for final scan (approximately L-1.5 hours), on OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167, **monitor/videotape** ET TPS surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, and TSM LH₂/LO₂ Umbilicals. No cryogenic liquid or excessive vapors allowed.

ETM Tom Ford Date 8/9/01

Support: COMM

Not Performed: N/A

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APPROVED

Final SSV Inspection Scan

NOTE

Final SSV Inspection Scan should begin not later than 1.5 hours prior to start of T-9 minute hold (approximately L-2 hours) to allow ample time to finish. Final SSV Inspection Scan shall include the ET, SRB's and the Orbiter.

Final SSV Inspection Scan may be altered or partially performed in the event that time constraints will not permit a complete SSV scan prior to start of T-9 minute hold.

70-10 CVM2 JTV2 225

Perform Final SSV Inspection Scan with OTV cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 064/164. Scan passes shall view entire SSV with cameras at full zoom in during final scan.

ETM Tom Ford Date 8/9/01

Support: COMM

Not Performed: N/A

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T-9 Minute Terminal Count

NOTE

Next step performed for terminal count only and may be not performed if launch is scrubbed prior to pick-up of T-9 minute terminal count. Cameras must be positioned for SSME ignition no later than T-9 minutes. 'Spot' scanning after pick-up of the T-9 minute terminal count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition in an arbitrary order.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for OTV operators to rehearse camera movements.

CVM2 camera positions for terminal count are defined in Table 70-1.

70-11 CVM2 JTV2 225

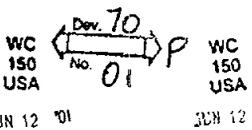
Ref Table 70-1, position cameras 009/109, 033/133, 056/156, 065/165, 066/166 061/161, 070/170, 071/171 and 067/167 for terminal count.

Support: COMM

ETM Wm Richards II Date 8-9-01

Not Performed: N/A

70-12 ~~Completion of this operation satisfies noted OMRS requirements.~~



~~OMRSD S00FB0:005-1~~
~~OMRSD S00FB0:360-1~~

ETM _____ Date _____

70-13 Operation - Group 2 Monitoring - LH₂ Chill Down Thru T-0 complete.

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Table 70-1 - CVM2 Camera Positions for Terminal Count

NOTE

This Table defines CVM2 camera positions for terminal countdown. Cameras should be positioned for ignition no later than pick-up of T-9 minutes count. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

The Orbiter access arm (OAA) retracts at T-7M30S. Orbiter body flap movement occurs at T-3m50s.

Cameras may be positioned for SSME ignition non-sequentially

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for operators to rehearse camera movements with ice console.

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Group 2 Camera Positions Are Defined As Follows:

033/133

Full zoom out. LO₂ feed line in frame center and MLP deck at bottom.

055/155

View ET aft dome with MLP deck just out of view at bottom, ET XT-2058 ring frame at frame top and both SRB's just in view at sides.

056/156

View ET aft dome with MLP deck just out of view at bottom. ET XT-2058 ring frame at frame top and both SRB's just in view at sides.

065/165

Full zoom out. SSV centered. MLP deck edge just in view at bottom.

066/166

ET centered. Intertank to LO₂ Barrel splice at frame top with the majority of Orbiter wing in view.

067/167

Center on GUCP for optimum view.

070/170 and 071/171

At T-9m00s, zoom in on space shuttle main engine with camera providing best view. Zoom out on SSME for wide angle view with other camera.

009/109

At approximately T-3m50s, position to view Orbiter body flap and elevons movement. Afterwards, center on LH₂ umbilical with -Y vertical strut at frame top.

061/161

At approximately T-1m30s, tilt-up to GO₂ Vent Footprint. Zoom in. Pause. If footprint is acceptable, zoom out and tilt down to view Orbiter nose/cockpit through liftoff.

***** End of Table 70-1 - CVM2 Camera Positions for Terminal Count *****

***** End of Operation 70 *****

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OPERATION 80 Final Inspection

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 3.0

NOTE

Final Inspection may not need to be performed depending on LO₂/LH₂ tanking and launch countdown, as determined by CTC/TTL.

Final Inspection Team stay time guidelines for each level are given in Table 80-1. These guidelines are for reference only and may be deviated from at PICE discretion.

Operation Not Performed: N/A

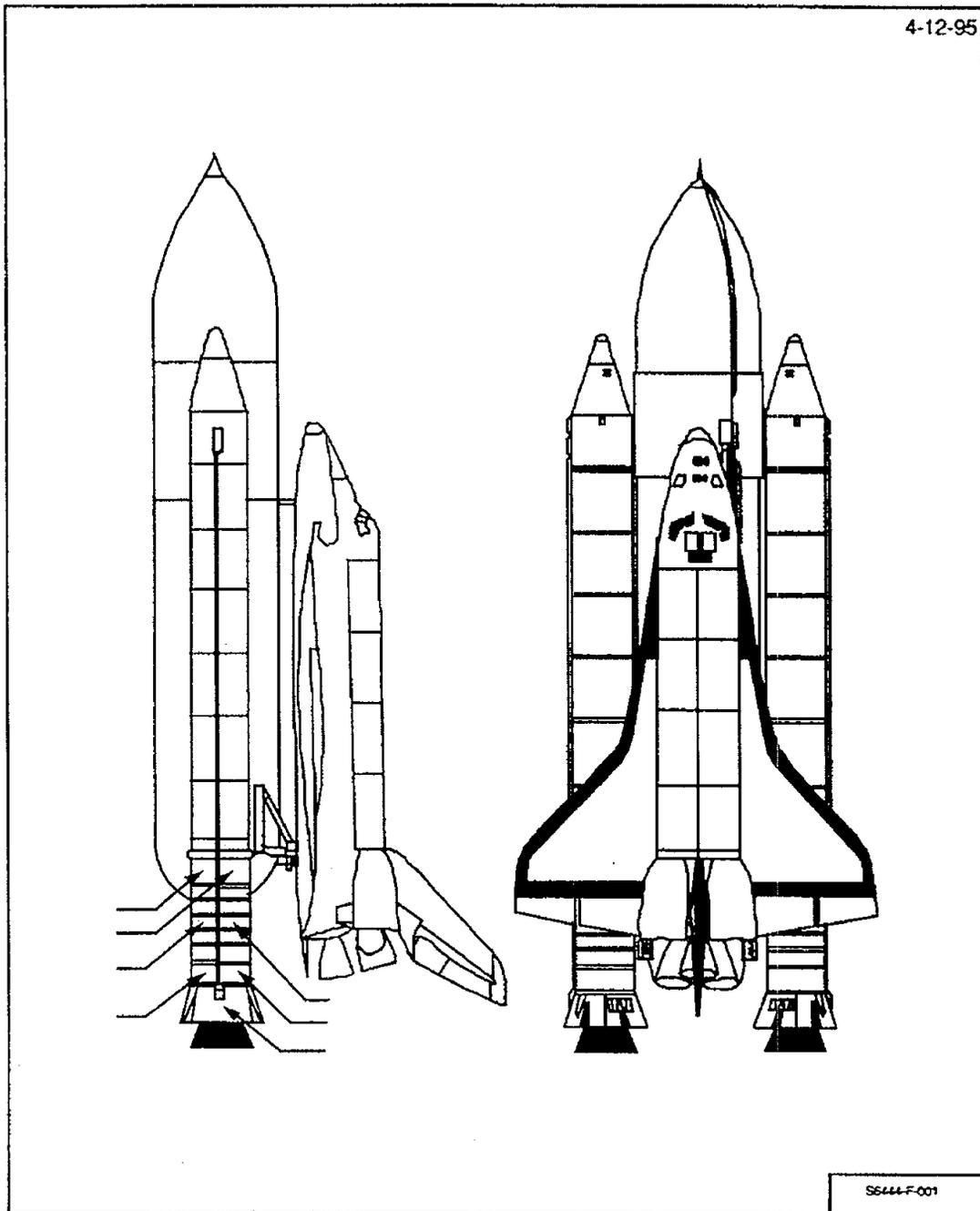


Figure 80-1: Deck (0) Level
(For Reference Only)

8/9/01

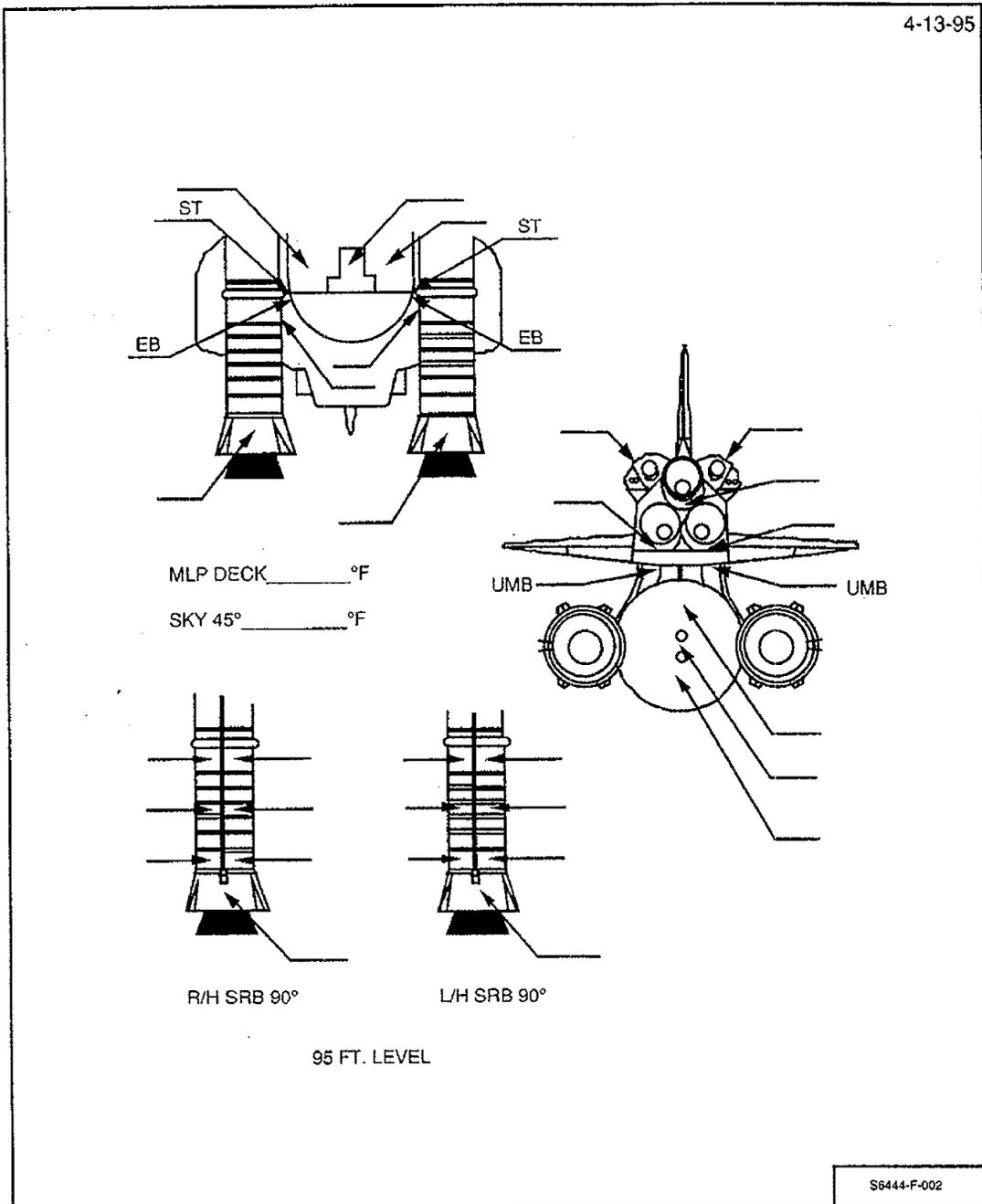


Figure 80-2: Deck (0) and 95 Ft Levels
(For Reference Only)

ET
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8/9/01

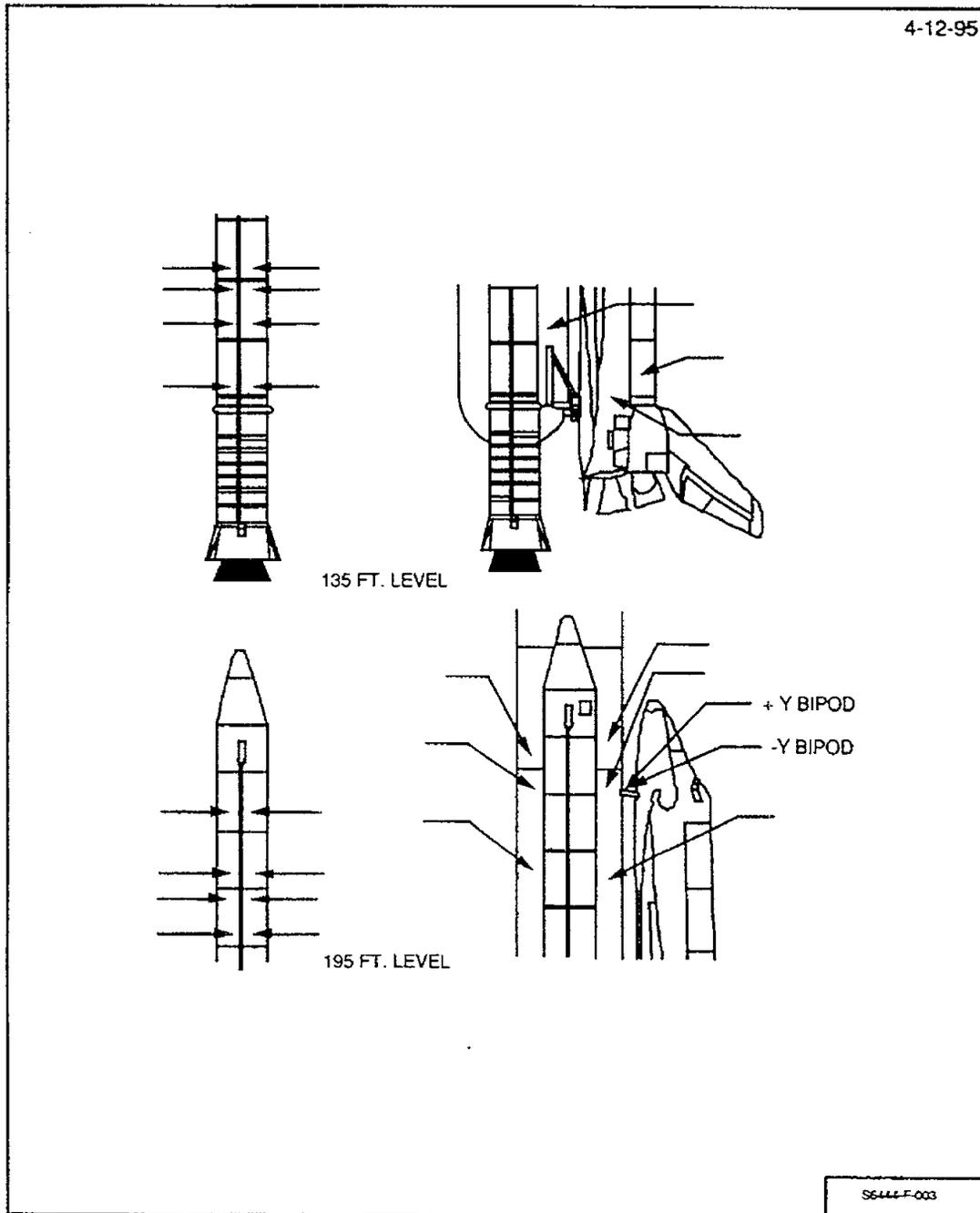


Figure 80-3: 135 and 195 Ft Levels
(For Reference Only)

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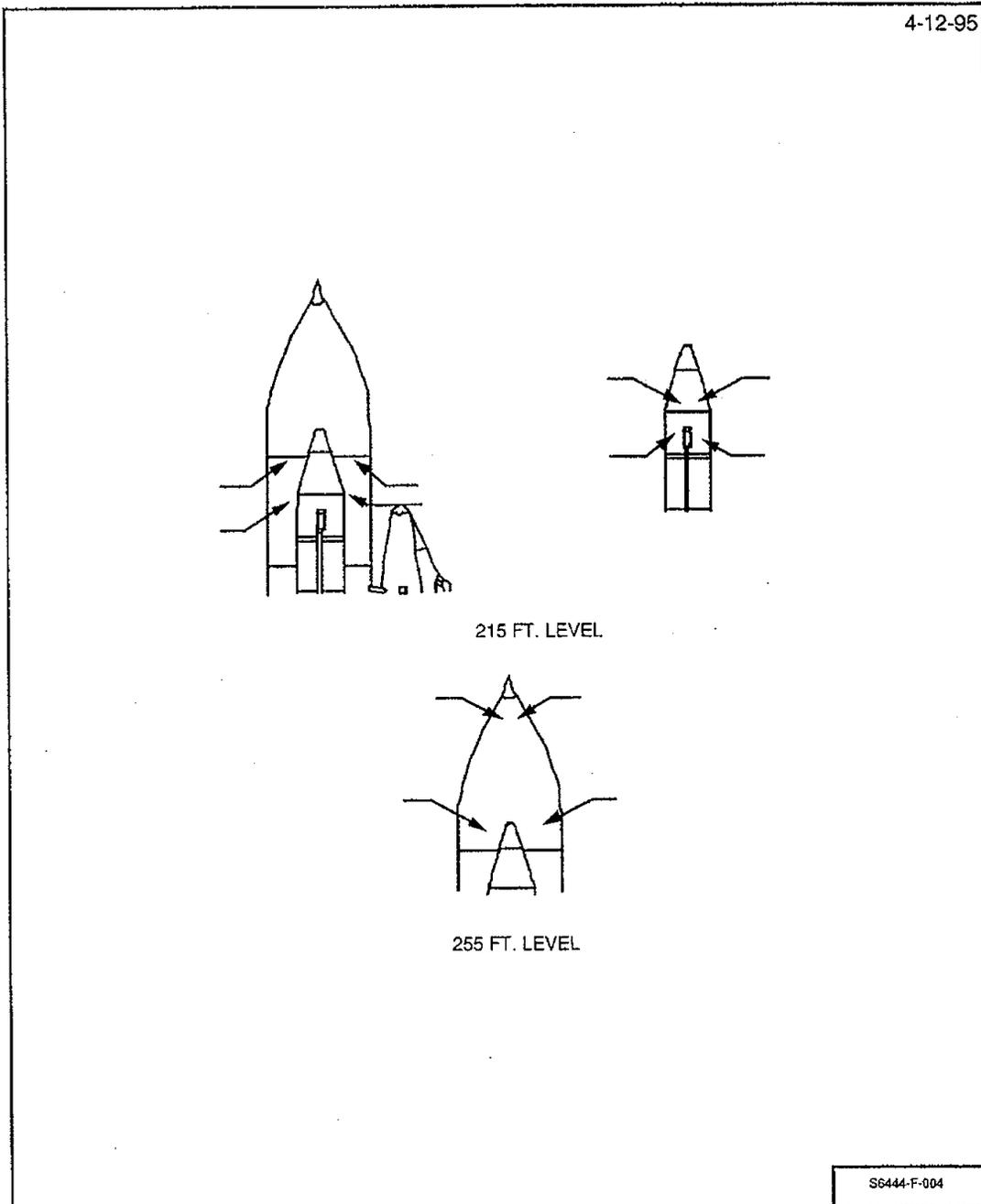


Figure 80-4: 215 and 255 Ft Levels
(For Reference Only)

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

WARNING

Personnel performing final inspection shall be attired in **Nomex coveralls with gloves and hoods**. Personnel shall have available gloves, hoods, and **ELSA** at all times during walkdown.

Personnel using Sony DKC-ID1 camera shall verify lithium ion battery is securely locked in bayonet connector and the lithium button battery door is locked and taped in place. Personnel shall ensure the flash is not activated on the camera.

Personnel using Kodak DC-50/120 shall verify alkaline batteries are properly installed and the flash is not active on the camera.

Personnel using digital cameras (Sony DKC ID1, Kodak DC-50/120 shall not use these cameras in the presence of a hydrogen leak or an oxygen enriched atmosphere (readings greater than 23 percent O₂).

NOTE

Task Team Leader (TTL) for final inspection is PH-H. Additional personnel (listed below) may be added to the final inspection team with CTC, Launch Director, and Safety concurrence.

JSC Level II	(1)
PH-H	(2)
SFOC ETM	(1)

ET
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80-1 Assemble following final inspection team members:

- TTL - PH-H (1)
- PH-H (1)
- SFOC ETM (2)
- LMSSC LSS (1)
- SFOC Safety (1)

80-2 Final inspection team **perform** walkdown of SSV and associated facilities as follows:

NOTE
35mm Photo's MAY BE NOT PERFORMED WITH TTL CONCURRENCE.

NOTE

Tables 80-2 and 80-3 are reference only items. Images are to be taken of targets of opportunity. Images must be taken with 35 mm and digital cameras. Digital images shall be inputted into SIMS.

1. Ref Tables 80-2 and 80-3, photograph SSV points of opportunity during final inspection using 35 mm. **Record** data.

Roll No. N/A

Negative No. N/A

Work order No. N/A

2. Reference Tables 80-2 and 80-3, **take** digital image of SSV points of opportunity using digital camera.

Description: Final Inspection Team

3. See Figures 80-1 through 80-4, **measure and record** (deg F) SSV external surface temperatures using IR gun(s)/scanners.

① 2M R. Sene ETM 8/16/01
SEE PFI CHANGE RECORD

① SKI NOT PERFORMED 8/16/01

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8/16/01

NOTE

The following substep references inspection areas. However, inspection shall not be limited to these areas. Inspection shall be of entire SSV and specific areas of concern as defined by the TTL, CTC, or Launch Director.

4. **Visually inspect:**

- Orbiter aft engine compartment external surfaces for condensation and ice formations.
- ET TPS surfaces which cannot be observed by the OTV system.
- Specific areas of concern as determined by the TTL, CTC, or Launch Director.

OMRSD S00U00.020-A-1

OMRSD S00U00.020-C-1

OMRSD S00U00.020-D-1

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80-3 Final Inspection complete. Verify no constraints to continue.

TTL (PH-H) *Armando Olea* Date 8/9/01
Armando Olea - NASA

SFOC-ETM

ME
08

 Date 8-9-01

80-4 Operation - Final Inspection complete.

ETM

ME
08

 Date 8-9-01

80-8

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Table 80-1 Final Inspection Team Walkdown Stay Times

255 Ft Level - 5 Minutes

- LO₂ Ogive and Barrel acreage
- GO₂ Pressurization Line
- LO₂ Tank Cable Tray
- Visible LH SRB surfaces
- GO₂ Vent Ducts

215 Ft Level - 20 Minutes

- ET GH₂ 7 inch Vent Assembly
- ET acreage (between -Z and -Y axis)
- GO₂ vent area
- Orbiter tiles
- Visible SRB surfaces
- Inter tank-to-LO₂ Barrel splice

195 Ft Level - 10 Minutes

- LO₂ Feed Line
- ET/Orbiter Bipods (side and bottom view)
- -Y ET/SRB forward attachment (bottom view)
- -Y ET/SRB aft attachments (top view)
- Inter tank splice areas (LO₂ and LH₂)
- ET acreage (between -Y and +Z axis)
- Orbiter tiles
- Visible LH SRB surfaces

135 Ft Level - 10 Minutes

- LH₂ ET/Orbiter Umbilical
- -Y ET/SRB C/T
- -Y Vertical Strut
- LO₂ Feed Line
- ET acreage between -Y axis and +Z axis
- ET/Orbiter attachments (top view)
- Visible LH SRB surfaces
- Orbiter aft fuselage

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Table 80-1 Final Inspection Team Walkdown Stay Times

0 Level - 30 Minutes

- LH₂ Aft Dome
- ET acreage around +Z axis
- ET acreage around -Z axis
- LO₂ Feed Line
- LH₂ Feed Line
- ET/Orbiter attachments - Bottom view
- ET/Orbiter LH₂ and LO₂ Umbilicals
- T-0 LH₂ and LO₂ Umbilicals
- Space Shuttle Main Engines (SSME)
- Orbiter tiles
- ET/SRB aft attachments
- Visible SRB surfaces
- SRB ignition overpressure sound suppression water troughs

*** End of Table 80-1- Final Inspection Team Walkdown Stay Times ***

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Table 80-2 Final Inspection Team - Telephotos

TELEPHOTOS - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
GO ₂ Vent Ducts	Horizontal	
LO ₂ Acreage	Vertical	

TELEPHOTOS - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
-Y Bipod Ramp	Horizontal	From RSS
LO ₂ P/L Ice Frost Ramps	Vertical	From RSS; Requires 3-4 shots
GO ₂ Seal/Hood	Horizontal	From haunch & RSS
GUCP	Vertical	

TELEPHOTOS - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
-Y Bipod Ramp & Jack PAD C/O	Horizontal	

TELEPHOTOS - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	
-Y Longeron	Vertical	If needed
Jack Pad Closeouts	Horizontal	
LH ₂ Acreage	Vertical	

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Table 80-2 Final Inspection Team - Telephotos

TELEPHOTOS - MLP

<u>Photo</u>	<u>Camera Orientation</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	From West
LH ₂ UMB	Horizontal	From NW
EB-7	Horizontal	
EB-8	Horizontal	
LH ₂ Aft Dome	Horizontal	
Third Hard Point C/O	Vertical	
LH ₂ Barrel	Horizontal	From North
SSV Overall	Horizontal	From North
SSV Overall	Horizontal	From East
LO ₂ F/L Bracket & Bellows	Vertical	XT-1973
LO ₂ F/L Bracket	Vertical	XT-1871
LO ₂ F/L Bracket	Vertical	XT-1623
LO ₂ F/L Bracket	Vertical	ST-1377 & XT-1129
LO ₂ F/L Bracket & Bellows	Vertical	XT-1129 & XT-1106 from SE
LO ₂ P/L & C/T	Vertical	From SE

600 MM PHOTOS - 255 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
GO ₂ Vent Ducts	1/30	Contingency

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Table 80-2 Final Inspection Team - Telephotos

600 MM PHOTOS - 215 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
-Y GO ₂ Seal	1/30	
-Y Bipod Ramp	1/30	Contingency
Jack Pad C/O's	1/4	Difficult if windy
LO ₂ F/L	1/15	
-Y Vertical Strut (Crack)	1/30	

600 MM PHOTOS - 195 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
-Y Bipod Ramp	1/30	Contingency

600 MM PHOTOS - 135 FT LVL

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
LH ₂ UMB	1/30	
-Y Vertical Strut (Crack)	1/60	
LO ₂ F/L Bellows	1/15	Contingency

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Table 80-2 Final Inspection Team - Telephotos

600 MM PHOTOS - MLP

<u>Photo</u>	<u>Shutter Speed</u>	<u>Notes</u>
LH ₂ UMB	1/30	From West
LH ₂ UMB	1/30	From NW
LH ₂ UMB	1/30	From East
LH ₂ UMB Actuator C/O	1/15 or 1/30	From North standing next to water pipe
LO ₂ UMB	1/5	Lower Inboard
LO ₂ UMB	1/8	Inboard
LO ₂ F/L Bracket & Bellows	1/15	One photo to include XT-1978 & XT-1973
LO ₂ F/L Bracket	1/15	XT-1871
LO ₂ F/L Bracket	1/15	XT-1623
LO ₂ F/L Bracket	1/15	XT-1377
LO ₂ F/L Bracket	1/30	One photo to include XT-1129 & XT-1106
LO ₂ F/L Bracket	1/30	From SE corner; One photo to include XT- 1129 & XT-1106
Jack Pad C/O's	1/15	From SE corner
Ice Frost Ramps or Pal Ramps	1/15 or 1/30	Contingency
LH ₂ UMB Inboard	1/15	From East
+Y Longeron	1/15 or 1/30	Contingency
-Y Longeron	1/15	Contingency

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Table 80-2 Final Inspection Team - Telephotos

WIDE ANGLE PHOTOS - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ Tank	Vertical	35-70 mm	
GO ₂ Vent Ducts	Horizontal	35-70 mm	

WIDE ANGLE PHOTOS - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Overall GH ₂ Vent Line	Horizontal	35-70 mm	
Orbiter Nose, ET -Y Side	Horizontal	35-70 mm	
Orbiter Nose, ET -Y, +Z Side	Horizontal	35-70 mm	From RSS
Forward Half of Vehicle	Vertical	28 mm	From RSS
Entire Orbiter	Vertical	28 mm	From RSS

WIDE ANGLE PHOTOS - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Aft Part of SSV, LH Wing	Vertical	35-70 mm	
Orbiter Fwd Section, Upper LH ₂ Tank	Vertical	35-70 mm	
Bipod, -Y, +Z Intertank Area	Horizontal	35-70 mm	

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Table 80-2 Final Inspection Team - Telephotos

WIDE ANGLE PHOTOS - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Orbiter Aft Section	Vertical	35-70 mm	
Lower LH ₂ Tank & LH SRB	Vertical	35-70 mm	

WIDE ANGLE PHOTOS - MLP

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
Overall Orbiter Left Side	Vertical	28 mm	
ET -Y, +Z Quadrant	Vertical	28 mm	
ET -Z Side	Vertical	28 mm	
ET +Y, +Z Quadrant	Vertical	28 mm	
Overall Orbiter Right Side	Vertical	28 mm	
ET Aft Dome	Horizontal	35-70 mm	
-Z Side of LO ₂ T-0; RCS Stinger	Horizontal	35-70 mm	
+Z Side of LO ₂ T-); RCS Stinger OMS Nozzle	Horizontal	35-70 mm	
-Z Side of LH ₂ T-0; RCS Stinger	Horizontal	35-70 mm	
+Z Side of LH ₂ T-0; RCS Stinger OMS Nozzle	Horizontal	35-70 mm	
Overall SSME Cluster	Horizontal	50 mm	-Y Side
SSME No. 2	Horizontal	50 mm	
SSME No. 1, -Z Side	Horizontal	50 mm	
SSME No. 3	Horizontal	50 mm	

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Table 80-2 Final Inspection Team - Telephotos

Overall SSME Cluster	Horizontal	50 mm	+Y Side
LO ₂ UMB Area	Horizontal	35-70 mm	
LH ₂ UMB Area	Horizontal	35-70 mm	
ET/ORB UMB & ORB Lower Surface	Horizontal	28 mm	From under ET

*** End of Table 80-2 Final Inspection Team - Telephotos ***

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APPROVED

Table 80-3 Reduced Final Inspection Team Photos

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 255 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
GO ₂ Vent Ducts	TELE	Horizontal	

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 215 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
-Y Bipod Ramp	Horizontal	TELE	From RSS
LO ₂ P/L Ice/Frost Ramps	Vertical	TELE	From RSS; 2 photos required
GO ₂ Seal/Hood	Horizontal	TELE	From RSS
GUCP	Vertical	TELE	
Fwd Half of SSV	Vertical	28 mm	From RSS
Entire Orbiter	Vertical	28 mm	From RSS

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 195 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
-Y Bipod Ramp & Jack Pad C/O's	Horizontal	TELE	

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01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 80-3 Reduced Final Inspection Team Photos

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - 135 FT LVL

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	TELE	
Orbiter Aft Section	Vertical	35-70 mm	

WIDE ANGLE & TELEPHOTO PHOTOGRAPHY - MLP DECK

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LH ₂ UMB	Horizontal	TELE	From West
ET Aft Dome	Horizontal	TELE	
Aft Hard Point Closeout	Vertical	TELE	
LH ₂ Tank	Horizontal	TELE	From North
LO ₂ Tank	Horizontal	TELE	From North
LO ₂ Tank	Horizontal	TELE	From East
LO ₂ F/L Bracket Bellows	Horizontal	TELE	XT - 1978 & XT - 1973
LO ₂ F/L Bracket	Horizontal	TELE	XT - 1871
LO ₂ F/L Bracket	Horizontal	TELE	XT - 1623
LO ₂ F/L Brackets	Horizontal	TELE	XT - 1377 & XT - 1129
LO ₂ F/L Brackets & Bellows	Horizontal	TELE	XT - 1129 & XT - 1108; from SE
LO ₂ P/L & C/T	Horizontal	TELE	From SE
Overall Orbiter Left Side	Vertical	28 mm	
ET -Z Side	Vertical	28 mm	
Overall Orbiter Right Side	Vertical	28 mm	
Overall SSME Cluster -Y Side	Horizontal	28 mm	

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 80-3 Reduced Final Inspection Team Photos

Overall SSME Cluster +Y Side	Horizontal	28 mm	
ET/Orb UMB & Orbiter Lower Surface	Horizontal	28 mm	From under ET

*** End of Table 80-3 - Reduced Final Inspection Team Photos ***

*** End of Operation **80** ***

ET
01
8/9/01

01-15-2001
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OMI S6444 J01
APPROVED

OPERATION 90 LO₂/LH₂ Drain Monitoring

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 4.0

NOTE

This operation is contingent upon progression of launch countdown and is performed after start of cryo (LO₂/LH₂) loading and subsequent launch scrub, FRF, or WCDDT.

Operation Not Performed: N/A

NOTE

This operation monitors the External Tank external surfaces during LO₂/LH₂ drain operations from time of detanking until 1.5 hours after LO₂/LH₂ low level sensors read dry via OTV 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171.

Noted requirements satisfied by this operation: OMRS S00E00.021

90-1 Record start date/time (GMT) of LH₂ and LO₂ Tank Drain.

LH₂ Drain Start Date 8-9-01 Time 22:51 GMT

LO₂ Drain Start Date 8-9-01 Time 21:28 ^{DETE} ~~8-9-01~~ GMT ME
08 8-9-01

ETM ME
08 Date 8-9-01

90-1

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

90-2 CVM1 JTV1 223

From start of LO₂ Tank Drain and LH₂ Tank Drain until respective LO₂/LH₂ low level sensors read dry, **monitor** ET external surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, TSM LH₂/LO₂ Umbilicals via OTV cameras. No cryogenic liquid or excessive vapors allowed.

ETM

ME
08

 Date 8-9-01

Support: COMM

90-3 Record date/time (GMT) when LO₂/LH₂ low level sensors read dry.

LH₂ Sensors Dry Date 8-10-01
8-9-01 Time 00:11 GMT
①

LO₂ Sensors Dry Date 8-9-01 Time 23:06 GMT

ETM

ME
08

 Date 8-9-01

① D. Seale ETM 8/9/01

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

90-4 CVM1 JTV1 223

Monitor ET external surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, TSM LH₂/LO₂ Umbilicals via OTV cameras for 1.5 hours after LO₂/LH₂ low level sensors have read dry. No cryogenic liquid or excessive vapors allowed. Record date/time (GMT) when monitoring complete.

LH₂ Complete Date 8-10-01 Time 0141 GMT

LO₂ Complete Date 8-10-01 Time 00:36 GMT

ETM W. Richards II Date 8-9-01

Support: COMM

WM. RICHARDS II

90-5 Completion of this operation satisfies noted requirements.

OMRSD S00E00.021 8/9/01

90-6 Operation - LO₂/LH₂ Drain Monitoring complete.

*** End of Operation 90 ***

90-3

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

OPERATION 100 Console Securing

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

100-1

CTIF	TBC	136
TBC	CTC	232

OTV support for ET thermal protection system evaluation no longer required.

100-2

CTIF	JYVR	138
------	------	-----

Perform the following:

1. Turn off video recorders.
2. Remove tape cartridges.
3. OTV support no longer required.

Support: COMM

100-3

CTIF	CVM1	222
	CVM2	

Secure consoles by setting all monitors to "Off" position.
Report completion.

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

NOTE
Perform next step only after a successful launch.

100-4

CTIF

Remove photo processing laptop computer from Firing Room.

Not Performed:

ME
08

8-9-01

100-5

CTIF	TBC	136
TBC	CTC	232

Firing Room 2, ice frost monitoring area securing complete.

100-6

Operation 100 - Console Securing complete.

ETM

ME
08

 Date 8-9-01

*** End of Operation 100 ***

ET
01

8/9/01

100-2

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

OPERATION 110 Summary Tape

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 18.0

NOTE

Observations/concerns observed during count are typically recorded on the summary tape real-time (trouble tape).

110-1 CICE

After launch or launch scrub, prepare a summary tape to include observations/concerns noted during count.

110-2 Operation Summary Tape complete.

ETM

ME
QB

Date 8-9-01

*** End of Operation 110 ***

110-1

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

OPERATION 120 Post Drain Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 2.0

NOTE

Post drain walkdown performed only after start of cryo (LH₂/LO₂) loading and subsequent launch scrub.

Operation Not Performed: N/A

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

Personnel shall wear **hardhats** and **flame retardant coveralls** while performing post drain walkdown.

NOTE

Post drain walkdown typically commences approximately 1.5 hours after LH₂/LO₂ low level sensors read dry.

Post drain walkdown performed in support of a 24 hour scrub turnaround is typically coincident with the L-20 hour pre-launch walkdown for the ensuing launch attempt.

NOTE

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are walkdown optional participants:

NASA Engr	(4)
SFOC Engr	(2)
LMSSC-LSS	(1)
Boeing LSS	(1)
SFOC Safety	(1)

- 120-1** NASA Lead ET Mechanical Systems Engineer (PH-H) verify essential personnel on station, properly attired, and ready to proceed with post drain walkdown.

Essential Personnel

NASA Engineering (PH-H)	1
SFOC Engineering (ETM)	1

NOTE

“Hands-on Investigation” is applicable only to those areas which are not understood or fully defined and which cannot be adequately evaluated otherwise.

- 120-2** Perform post drain walkdown as follows:

- 1.** Visually inspect ET TPS exterior surfaces after detanking and warm-up (approximately T + 4 hours after drain is initiated) from the MLP, FSS, and RSS as access permits.
- 2.** Perform hands-on investigation of all areas suspected of violating Doc: NSTS 08303 (LI) NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA (LI)

OMRSD S00E00.031

USA
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8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

120-3 Walkdown complete. All discrepancies identified. No constraints to continue.

PH-H *Jorge Rivera* Date *8-9-01*
Jorge Rivera, NASA/KSL

ETM *Wm Richards II* Date *8-9-01*
Wm Richards II

120-4 Operation Post Drain Walkdown complete.

*** End of Operation 120 ***

STEP 120-3

STS-105 POST DRAIN SSV/MLP INSPECTION

KSC Debris Team

August 9, 2001

The post drain inspection of STS-105, MLP-3, and Pad A FSS was conducted on August 9, 2001 from 2200 to 2300 hours under dark conditions. Nevertheless, visibility was adequate for the inspection.

No MLP deck or facility anomalies were detected.

Likewise, no anomalies were observed on the SRB's.

Orbiter tiles, RCC panels, and SSME's were in nominal configuration. RCS thruster paper covers were intact.

The GOX vent arm was in the retracted position. OTV monitoring from LCC Firing Room 2 was performed prior to and during GVA retraction and had verified no anomalies with the vent system or the ET nose cone and forward LO2 tank TPS. The post detank Pad inspection also verified no anomalies in this area. No topcoat was missing from the nose cone area under the GOX vent seal footprint.

The External Tank was in excellent condition. Bipod jack pad standoff closeouts were in nominal condition. All PDL repairs were intact with none protruding. No crushed foam or debris was detected in the LO2 feedline support brackets. The stress relief crack in the -Y vertical strut forward facing TPS was still present, but not nearly as pronounced as had been observed with LCC firing room OTV. A small area of frost was observed on the +Y longeron TPS closeout with LCC firing room OTV during de-tanking. No TPS anomaly was observed in this area during the post drain inspection (Ref. photos located in SIMS, Ice Team Bucket).

The only ice remaining was located in the LO2 feedline bellows, -Y aft fairing-to-ET/SRB cable tray interface, the lower EB fittings, and on the ET/ORB umbilical purge vents.

In summary, no IPR conditions and no flight hardware concerns were detected during the post drain inspection. There are no constraints for the next cryoload.

Jorge Rivera, NASA-KSC

ET
01
8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

OPERATION 130 Post Launch Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 3.0

3.0
3.0
A2U

NOTE

Do not perform this operation after launch scrub.

Operation Not Performed:

ME
OB

 8-9-01

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a **safety harness** with a **lanyard** secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

Personnel participating in walkdown shall wear **hardhats** and **flame retardant coveralls**.

NOTE

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are walkdown optional participants:

NASA Engr	(3)
SFOC Engr	(2)
LMSSC-LSS	(1)
Boeing LSS	(2)
SRB ELE	(1)
Thiokol-LSS	(1)
SFOC Safety	(1)

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

130-1 NASA (PH-H) verify following personnel on station, properly attired, and ready to proceed with post launch walkdown.

WC
150
USA
JUN 12 '01

Dev. 130
No. 01 → P

ET
01
SEE DEV 8/9/01

Essential Personnel		
NASA	PH-H	1
SFOC	ETM	1

130-2 Perform Post Launch Walkdown as follows:

1. Ref Table 130-1, **visually inspect** post launch pad/area to identify any lost flight or ground systems hardware and debris sources.
2. Ref Table 130-2, **document/SIMS photograph** launch PAD area configuration.

Description: Post Launch Walkdown

USA
VM
067

OMRSD S00U00.010-1

130-3 Walkdown complete. Debris sources and lost flight hardware identified. No constraints to continue.

PH-H N/A Date N/A

ETM N/A Date N/A

130-4 Operation - Post Launch Walkdown complete.

ET
01
8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 130-1 Post Launch Walkdown Inspection Areas

Record mission info, PAD, date, and time:

STS _____

PAD _____

Date _____

Time _____

SRB Hold-down posts (HDP)

Inspect for damage, stud hang-up Epon shim material, ordnance fragments, doghouse blast covers, erosion, missing hardware, debris. Record Results:

N/A

MLP Deck

- SRB aft skirt purge lines
- SRB T-0 umbilicals
- Tail service masts (TSM's)
- MLP deck

195 Ft Level

- Orbiter access arm (OAA)

ET
01
8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 130-1 Post Launch Walkdown Inspection Areas

215 Ft Level - GH2 Vent Line/GUCP

Latch position
Loose cables
Damage from SRB plume
Damage to the QD

255 Ft Level - GO₂ Vent Arm, Ducts, Hood

Seals
Hood windows, doors, latches

Fixed Service Structure (FSS)

Cable tray covers
Signs
Hydraulic leaks
Slidewire baskets

PAD Apron/Acreage

Vehicle hardware and/or flight TPS materials *N/A*
Facility debris

Table K-1 PAD Apron/Acreage Items

<u>Description</u>	<u>Location</u>

*** End of Table 130-1 - Post Launch Walkdown Inspection Areas ***

ET
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8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

Table 130-2 Post Launch Photos (MLP, FSS, PAD, Apron, Pad Acreage)

MLP 0-level

- 1 Ea HDP No. 1, 2, 5 & 6 (HDP shoe and Epon shim)
- 1 Ea HDP No. 3, 4, 7 & 8 (blast cover down to HDP base)
- 1 Ea SRB T-O umbilical
- 1 Ea overall view SRB exhaust cutouts\

Any unusual or debris-related damage to the facility; sound suppression water pipes, TSM's cracks in MLP deck, witness panels, handrails, etc.

Any flight hardware debris (tiles, SRB ordnance fragments)
Any facility debris (nuts, bolts, cable tray covers, etc.)

FSS

- Close-ups of GUCP and latching mechanism
- Overall views of GO₂ vent hood/ducts, if damaged
- Any flight hardware or facility debris
- Any unusual or debris-related damage to the facility

PAD Apron/PAD Acreage

Any flight hardware or unusual facility debris objects

Any unusual or debris-related damage to the PAD (such as missing brick in the flame trench), perimeter fence, etc.

***** End of Table 130-2 - Post Launch Photos (MLP, FSS, PAD, Apron, Pad Acreage) *****

***** End of Operation 130 *****

ET
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8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

021
A20

OPERATION 140 Film Review

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE
This operation may be not performed after launch scrub.

WC
150
USA
JUN 12 '01

Op. 140
No. 01

ET
01
8/9/01
SEE DEV

Operation 140 Not Performed:

ME
08
8-9-01

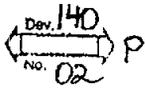
- 140-1 Review engineering films for FOD issues, launch anomalies, or other discrepancies.
- 140-2 Operation - Film Review complete.

ETM N/A Date N/A

*** End of Operation 140 ***

ET
01
8/9/01

WC
150
USA
JUL 9 '01



ET
01
8/9/01
SEE DEV

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150
150

ET
01

8/9/01

01-15-2001
APPROVED

OMI S6444 J01
APPROVED

OPERATION 150 Final Report

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

NOTE

This operation may be not performed after launch scrub.

Operation 150 Not Performed:

ME
OB

8-9-01

150-1 Assemble final report by attaching following reports to this OMI.
Reference each to this step.

Post Launch PAD Assessment
SRB Assessment
Launch Film Review
Launch Day Video Review
Orbiter Landing Assessment
ET Separation Review

150-2 Final report assembly complete.

WC 150 USA
Dow. 150
No. 01
P
JUN 12 '01

WC 150 USA
JUN 12 '01

ETM N/A Date N/A

~~OMRSD S00U00.011-1~~

150-3 Operation - Final Report complete.

*** End of Operation 150 ***

140-1

ET
01

8/9/01

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*****
* PROGRAM PRA120 SELECTION CRITERIA
* -----
* RPT TYPE: IPR
* PR GROUP:
* WORK AREA CD:
* PR ELEM CD:
* STS NO:
* Starting RPT DT: 06/28/01
* Ending RPT DT: 08/22/01
* LRU or Non-LRU: B
* PRACA EFF CD:
* EICN:
* RPT STATUS: OP
* DETECTED DURING: S6444
* -----
* Sorted by DETECTED DURING, PR ELEM CD, and EICN
*****

```

S6444
TEN 28/01



AUG 27 '01

DATE: 08/22/01 16:21
REPORT CODE: PRA1200A

PROBLEM REPORTING AND CORRECTIVE ACTION SYSTEM
PROBLEMS BY DETECTED DURING

PAGE:

* NO DATA FOUND ON THE DATABASE FOR THE SELECTED PARAMETERS *
*

*
* END OF REPORT *
*

56444
7228822



AUG 22 '01



TOP/WAD Deviation

Dev No. <u>10-01</u>		DILS No. <u>89333(5)</u>		Page 1 of 5
TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-104	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale ETM 4/27/01</i>	Contractor Test Conductor <i>T. Ford 4/27/01</i>	Gov't OPR <i>PH-112</i>	Gov't Project Engineer	
Contractor Test Project Engineer	Other <i>USA ETM</i>	Gov't Test Director or Contractor Chief TC		
Contractor Safety <i>R. Seale 28 Jun 01</i>	Other			

Page Number: 10-1 Step Number: 10-3

Add Operation 11 as follows:

OPERATION 11 - IR Camera Setup

WARNING
Hard hats required on the Pad when SSV is not present.

CAUTION
Exercise care to avoid dropping equipment, fasteners, etc. from RSS Roof. All tools must be tethered.

11-1 Install IR Camera at RSS Roof site as follows:

1. **Rotate** camera housing back cover to open position by removing bolts with flat washers (20 pl). **Retain** bolts/washers for reinstallation.
2. **Remove** camera housing front cover by removing fasteners (2 pl). **Reinstall** fasteners after cover removal. **Retain** cover for reinstallation after IR Camera Unit removal.
3. **Install** IR Camera Unit into camera housing. **Secure** IR Camera Unit in housing by locking spring pin at lower, left.

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
--------------------------------	--------------------	-----------------	---------------------	-----------------	---

ET
01
8/1/01



TOP/WAD Deviation

Dev No. <u>10-01</u>		DILS No. <u>89333</u> (S)		Page 2 of 5
TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-104	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale ETM 4/27/01</i>	Contractor Test Conductor <i>TO 27 6-28-01</i>	Gov't OPR <i>Vol... 4-27-01</i>	PA-#2	
Contractor Test Project Engineer	Other <i>Tom Ford 4-27-01</i>	Gov't Project Engineer		
Contractor Safety <i>R. Seale 28 Jun 01</i>	Other	Gov't Test Director or Contractor Chief TC		

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow opened back cover to exert undue force on cables once cables have been connected.

4. **Connect:**
 - OTV Coaxial cable
 - Pan & Tilt cable
 - Controller cable
 - Power cable

5. **Rotate camera housing back cover into closed position. Secure back cover by installing bolts/flat washers (20 pl). Tighten bolts wrench tight.**

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Insure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain, eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear solvex gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 04-13-01

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

8/1/01



TOP/WAD Deviation

Dev No. 10.01 DILS No. 89333(5) Page 3 of 5

TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
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First Use SRB BI- ET GSE STS-104
 Effectivity: ORB /FLT FRCS/POD /FLT SSME /FLT

Affected: OMRS/ACOMC/OMP Design Req'ts Haz Step(s) PPE Internal Review Req.

Contractor OPR <i>R. Seale ETM 4/27/01</i>	Contractor Test Conductor <i>7027 6-28-01</i>	Gov't OPR <i>PH-H2</i>
---	--	---------------------------

Contractor Test Project Engineer	Other <i>Tom Ford 4.27.01</i>	Gov't Project Engineer
----------------------------------	----------------------------------	------------------------

Contractor Safety <i>R. Seale 28 Jun. 01</i>	Other	Gov't Test Director or Contractor Chief TC
---	-------	--

- 6. Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl Alcohol .
- 7. Perform functional checkout of IR Camera Unit using local controller if required at Task Team Leader (TTL) discretion.

S/S 7 Not Performed: 
 8-1-01

NASA PH-H: *MRP* Date: *4/1/01*
 USA ETM: *R. Seale* Date: *8/1/01*

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle	ET 01
--------------------------------	--------------------	-----------------	---------------------	-----------------	---	------------------------

8/1/01



TOP/WAD Deviation

Dev No. <u>10.01</u>	DILS No. <u>89333(9)</u>	Page 4 of 5
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TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-104				
Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT				
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Internal Review Req.				
Contractor OPR <i>R. Seale ETM 4/27/01</i>	Contractor Test Conductor <i>T.O 27 628-01</i>	Gov't OPR <i>PH-A2</i>		
Contractor Test Project Engineer	Other <i>Tom Ford 4.27.01</i>	Gov't Project Engineer		
Contractor Safety <i>RK Seaby 28 Jun 01</i>	Other	Gov't Test Director or Contractor Chief TC		

SEE PRI CHANGE RECORD
 R. Seale ETM 7/13/01

11-2

Install IR Camera at Camera Site 2 as follows:

1. **Rotate** camera housing back cover to open position by removing eight ea. bolts using Phillips screwdriver. **Retain** bolts/washers for reinstallation.
2. **Remove** camera housing front cover by removing securing bolt(s). **Reinstall** bolt(s) after cover removal. **Retain** cover for reinstallation after IR Camera Unit removal.
3. **Install** IR Camera Unit into camera housing. **Secure** IR Camera Unit in housing by tightening set screw(s) wrench tight at lower, left/right.

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

4. **Connect:**
 - OTV Coaxial cable
 - Pan & Tilt cable
 - Controller cable (2 pl)
 - Power cable
5. **Rotate** camera housing back cover into closed position. **Secure** back cover by installing bolts (8 pl). **Tighten** bolts using Phillips screwdriver.

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

7/13/01



TOP/WAD Deviation

Dev No. 10-01 DILS No. 89333(5) Page 5 of 5

TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-104				
Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT				
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Internal Review Req.				
Contractor OPR <i>R. Seale</i> <i>4/27/01</i>	Contractor Test Conductor <i>T027 (6-28-01)</i>	Gov't OPR <i>Robert Brewer</i> <i>PH-HZ</i> <i>4-27-01</i>		
Contractor Test Project Engineer	Other <i>Tom Ford</i> <i>4-27-01</i>	Gov't Project Engineer		
Contractor Safety <i>AK Saubey</i> <i>28 Jun. 01</i>	Other	Gov't Test Director or Contractor Chief TC		

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Insure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain, eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear **solplex gloves** and **chemical splash goggles**. When working at eye level or above wear a **face shield** over goggles.

WS002.a 04-13-01

- Clean** IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl Alcohol.
- Perform** functional checkout of IR Camera Unit using local controller if required at Task Team Leader (TTL) discretion.

S/S 7 Not Performed: N/A

NASA PH-H: *Robert Brewer* ^{SPEECE} Date: 7-18-01
 USA ETM: *R Brewer* Date: 7-18-01

Reason: Establish operational controls for installation of the IR Camera units on the RSS Roof and Camera Site 2.

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET 01

7/13/01



TOP/WAD Deviation

Dev No. 50-01 DILS No. 87031 (S) Page 1 of 4

TOP/WAD No. S6444	REV/CHG/VER J01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 30
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-100	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input checked="" type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale ETM 4/5/01</i>	Contractor Test Conductor <i>Jim Taylor 4-9-01</i>	Govt OPR <i>[Signature]</i>	<i>PA-112 Spec 46-d</i>	
Contractor Test Project Engineer <i>[Signature] 4/9/01</i>	Other <i>Mark Wollen 4/5/01</i>	Govt Project Engineer		
Contractor Safety	Other	Govt Test Director or Contractor Chief TC <i>[Signature] NTD 4/9/01</i>		

Page Number: 50-4 Step Number: 50-8

Add following (one line below end of step text):

OMRS S00FB0.350-1

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/5/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

8/9/01



TOP/WAD Deviation

TOP/WAD No. S6444		REV/CHG/VER J01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 30
Dev No. <u>50-01</u>		DILS No. <u>87031 (S)</u>		Page 2 of 4	
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-100	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT		Affected: <input checked="" type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale ETM 4/5/01</i>	Contractor Test Conductor <i>Jim Taylor 4-9-01</i>	Govt OPR <i>PH-HZ</i>	Govt Project Engineer <i>Robert F. ... 4-6-01</i>		
Contractor Test Project Engineer <i>Mark Wollam 4/5/01</i>	Other <i>Mark Wollam 4/5/01</i>	Govt Test Director, or Contractor Chief TC <i>Stephen ... 4/9/01</i>			
Contractor Safety					

Page Number: 50-5 Step Number: 50-10

Add steps 50-10.1 with preceding Note and 50-10.2 as follows:

NOTE

Excessive vapors are defined as being more severe than those described in NSTS 08303 (LI) NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA or NSTS 16007 (LI) NSTS PROGRAM LAUNCH COMMIT CRITERIA - HAZARDOUS GAS SUBSYSTEM .

50-10.1 CTIF CVM1 222
CVM2

From start of LO₂ / LH₂ loading until Prepressurization (LO₂ at T-2M55s and LH₂ at T-1M57s):

1. Monitor following ET-Orbiter MPS areas for leakage:
 - LO₂ Feedline (portion external to the Intertank)
 - LH₂ Feedline
 - LH₂ Recirculation Line
 - LH₂ Aft Dome Manhole Cover(s)
 - ET-Orbiter LO₂ / LH₂ Umbilical Disconnects
 - LH₂ T-0 Umbilical
 - LO₂ T-0 Umbilical
2. Verify no visible cryogenic liquid of excessive vapors.

OMRS (general) S00FB0.360-1

ETM ME
OB Date 8-9-01

Not Performed: N/A

SPC 161
AUG 22 '01

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/5/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01
8/9/01



TOP/WAD Deviation

Dev No. 50-01 DILS No. 87031 (5) Page 3 of 4

TOP/WAD No. **S6444** REV/CHG/VER **J01** In Family Out of Family Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) **E** Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite **30**

First Use SRB BI- ET GSE STS-100 Effectivity: ORB /FLT FRCS/POD /FLT SSME /FLT

Affected: OMRS/ACOMC/OMP Design Req'ts Haz Step(s) PPE Internal Review Req.

Contractor OPR *R. Seale ETM 4/5/01* Contractor Test Conductor *Jim Taylor 4-9-01* Gov't OPR *Robert F. Speer 4-6-01 PH-AZ*

Contractor Test Project Engineer *Mark Wollam 4/5/01* Other *Mark Wollam 4/5/01* Gov't Project Engineer

Contractor Safety *Stephen J. Payne 4/9/01* Other *Stephen J. Payne 4/9/01* Gov't Test Director or Contractor Chief TC

50-10.2 CTIF CVM1 222 CVM2

Monitor and videotape record following ET TPS surface areas and GO₂ Vent Area during LO₂ / LH₂ loading through Prepressurization (LO₂ at T-2M55s and LH₂ at T-1M57s):

- LH₂ Aft Dome
- LH₂ Barrel
- Intertank (external)
- LO₂ Tank
- GO₂ Vent Area
- Protuberances

OMRS (general) S00FB0.005-1

ETM ME
08 Date 8-9-01

Not Performed: N/A

SPC 151

AUG 22 '01

Originator (print) **R. Seale** SPDMS ID **T08011** Phone **1-3348** Organization **ETM** Date **4/5/01** Perm Temp Temp-Recycle

ET 01
8/9/01



TOP/WAD Deviation

Dev No. 50-01	DILS No. 87031 (S)	Page 4 of 4
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TOP/WAD No. S6444	REV/CHG/VER J01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 30
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First Use SRB BI- ET GSE STS-100
 Effectivity: ORB /FLT FRCS/POD /FLT SSME /FLT

Affected: OMRS/ACOMC/OMP Design Req'ts Haz Step(s) PPE Internal Review Req.

Contractor DPR <i>R. Seale ETM 4/5/01</i>	Contractor Test Conductor <i>Jim Taylor 4-9-01</i>	Gov't OPR <i>Robert F. Pearce 4-6-01</i>
Contractor Test Project Engineer <i>Bill Kelly Conway 4/5/01</i>	Other <i>Mark Wollen 4/5/01</i>	Gov't Project Engineer
Contractor Safety	Other	Gov't Test Director or Contractor Chief TC <i>Stephen Hope 4/9/01</i>

Page Number: 50-9 Step Number: 50-18

Change step 50-18 as follows:

was: "... are 38 knots or ..."

is: "... are 38 knots (peak as measured at 60 feet above ground) or ..."

Page Number: 50-9 Step Number: 50-19

Add step 50-19.1 as follows:

50-19.1 CTIF

ET-Orbiter MPS monitoring for leakage and ET TPS Surface Areas and GO₂ Vent Area monitoring/recording for launch complete.

OMRSD S00FB0.005-1
OMRSD S00FB0.360-1

ETM *R. Seale* Date *8/9/01*

Not Performed: N/A

Reason: Ensure text of operational instructions complies with the OMRS.



AUG 22 '01

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/5/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01
8/9/01

DEVIATION INDEX

WAD NO.

PERMANENT TEMPORARY TEMP RECYCLE

S6444 REV: J CHG:01 (OMI)

DATE/TIME: 04/10/2001 05:38:10

TASK NO./SEQ. NO. 60

DEV NO.	SEQ/STEP	EFFECTIVITY	QC/PP&C	DATE	REMARKS
60-01	60 1		*	2001-04-09	

ET
01

8/13/01



TOP/WAD Deviation

Dev No. 60-01 DILS No. 87032 (S) Page 1 of 1

TOP/WAD No. S6444	REV/CHG/VER J01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,I,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 30
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First Use SRB BI- ET GSE STS-100
 Effectivity: ORB /FLT FRCS/POD /FLT SSME /FLT

Affected: OMRS/ACOMC/OMP Design Req'ts Haz Step(s) PPE Internal Review Req.

Contractor OPR <i>R. Seale ETM 4/5/01</i>	Contractor Test Conductor <i>Jim [unclear] 4-9-01</i>	Gov't OPR <i>Robert F. [unclear] 4-6-01</i>
Contractor Test/Project Engineer <i>Paul Celery Conway 4/3/01</i>	Other <i>Mark Wollam 4/5/01</i>	Gov't Project Engineer <i>[unclear]</i>
Contractor Safety	Other	Gov't Test Director or Contractor Chief TC <i>Stephen J. [unclear] 4/9/01</i>

Page Number: 60-1 Step Number: 60-1

Delete OMRS S00FB0.005-1 and S00L00.150-1 from Note preceding step 60-1: "Noted ... operation." ^①

Page Number: 60-6 Step Number: 60-12

Delete OMRSD S00FB0.005-1 and OMRSD S00L00.150 ^{and} from step 60-12. ^①

Reason: These OMRSD's have been moved to Operation 50.

Originator (print) R. Seale.	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/5/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

8/13/01



TOP/WAD Deviation

TOP/WAD No. S6444		REV/CHG/VER J01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Page 1 of 1 Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 30
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-100	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT		Affected: <input checked="" type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Internal Review Req.		
Contractor QPR <i>R. Seale ETM 4/5/01</i>	Contractor Test Conductor <i>Jim Taylor 4-9-01</i>	Gov't OPR <i>PH-A12</i>	<input checked="" type="checkbox"/> ME TO		
Contractor Test Project Engineer <i>Paul Cherry Conway 4/9/01</i>	Other <i>Mark Wollam 4/5/01</i>	Gov't Project Engineer <i>4-6-01</i>			
Contractor Safety	Other	Gov't Test Director, or Contractor Chief, TC <i>Stephen J. Payne 4/9/01</i>			

Page Number: 70-1 Step Number: 70-1

Delete OMRS S00FB0.005-1 and S00FB0.360-1 from Note preceding step 70-1: "Noted ... operation."
⓪

Page Number: 70-6 Step Number: 70-12

Delete OMRSD S00FB0.005-1 and OMRSD S00FB0.360-1 ^{and} from step 70-12.
⓪

Reason: These OMRSD's are satisfied via Operation 50.

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/5/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

8/13/01



TOP/WAD Deviation

Dev No. 130-01 DILS No. 87034 (S) Page 1 of 1

TOP/WAD No. S6444	REV/CHG/VER J01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,I,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 30
First Use <input type="checkbox"/> SRB B1- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-100				
Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT				
Affected: <input checked="" type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Internal Review Req.				
Contractor OPR <i>R. Seale Firm 4/5/01</i>	Contractor Test Conductor <i>Jim Taylor 4/9/01</i>	Gov't OPR <i>PH 4/2</i>		
Contractor Test/Project Engineer <i>Paul Wiley Conway 4/8/01</i>	Other <i>Mark Wollen 4/5/01</i>	Gov't Project Engineer <i>4-6-01</i>		
Contractor Safety	Other	Gov't Test Director or Contractor Chief TC <i>4/9/01</i>		

Page Number: 130-2 Step Number: 130-2

Add following Note prior to step 130-2:

NOTE

Post Launch Walkdown must be performed prior to washdown and Pad being opened for normal work.

Reason: Ensure text of operational instructions complies with OMRS S00U00.010-1.

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/5/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

8/9/01



TOP/WAD Deviation

TOP/WAD No. S6444		REV/CHG/VER J01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Page 1 of 1
Cause Code Reason 10-Tech Chg. 20-Proc Chg 30-Auth Error 40-Rewrite 30					
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-100					
Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT					
Affected: <input checked="" type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Internal Review Req.					
Contractor OIR <i>R. Seale ERM 4/5/01</i>	Contractor Test Conductor <i>Jim Taylor 4-9-01</i>	Gov't MPR <i>[Signature]</i>			
Contractor Test Project Engineer <i>[Signature]</i>	Other <i>Mark Wollan 4/5/01</i>	Gov't Project Engineer <i>[Signature]</i>			
Contractor Safety	Other	Gov't Test Director or Contractor Chief TC <i>[Signature]</i>			

Page Number: 140-1 Step Number: 140-1

Add following Note and change step 140-1 to read as follows:

NOTE

Analysis of Pad Debris Inspection Results determines priority for film review. All critical film (as determined by the Debris Team) must be reviewed as soon as possible after launch and no later than 36 hours prior to entry (of the Orbiter into the earth's atmosphere).

- 140-1** Review and analyze all engineering launch (and flight film) to:
- Identify any debris damage to the SSV
 - Identify flight vehicle or ground system damage that could affect Orbiter flight operations or future SSV launches.

Z90
WA
USA
OMRSD S00U00.011-1

ETM: N/A Date N/A

Reason: Ensure text of operational instructions complies with the OMRS S00U00.011-1.

SPC
181
AUG 22 '01

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/5/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01
8/4/01



TOP/WAD Deviation

Dev No. <u>140-02</u>	DILS No. <u>89334 (5)</u>	Page 1 of 5
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TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-104	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale ETM 6/27/01</i>	Contractor Test Conductor <i>[Signature]</i>	Gov't OPR <i>[Signature]</i>	<i>PH-112</i>	
Contractor Test Project Engineer	Other <i>[Signature]</i>	Gov't Project Engineer		
Contractor Safety <i>R. Sealey 28 Jun. 01</i>	Other <i>EF Check Richards 28 Jun 01 6-27-01</i>	Gov't Test Director or Contractor Chief TC		

Page Number: 140-1 Step Number: 140-2

Add Operation 141 as follows:

OPERATION 141 - IR Camera Removal

NOTE
IR CAMERA REMOVAL MAY
BE NOT PERFORMED IF
IR CAMERA(S) NOT INSTALLED
OR LAUNCH SCRUBS DECLARED.

WARNING
Hard hats required on the Pad when SSV is not present.

CAUTION
Exercise care to avoid dropping equipment, fasteners, etc. from RSS Roof. All tools must be tethered.

141-1
11-1

Remove IR Camera from RSS Roof site as follows:

1. **Remove** fasteners (2 pl) from camera housing front. **Retain** fasteners for reinstallation when front cover is installed.
2. **Install** camera housing front cover using previously removed fasteners (2 pl). **Tighten** fasteners (2 pl) wrench tight.

① ZPI R. Seale ETM 8/9/01
 SEE P+I CHANGE RECORD

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 6/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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AUG 22 '01

01
8/9/01

Dev No. <u>140-02</u>	DILS No. <u>89334(9)</u>	Page 2 of 5
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TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-104	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale</i> <i>6/27/01</i>	Contractor Test Conductor <i>TO 27 6-28-01</i>	Gov't OPR <i>[Signature]</i> <i>PA-HZ</i> <i>6-28-01</i>	Gov't Project Engineer	
Contractor Test Project Engineer	Other	Gov't Test Director or Contractor Chief TC		
Contractor Safety <i>RK Sealey</i> <i>28 Jun. 01</i>	Other <i>SE Check</i> <i>6-27-01</i>			

WARNING

Power cable is live. Care should be exercised when disconnecting power cable to avoid electric shock.

CAUTION

Do NOT allow back cover to exert undue force on cables when opening/rotating back over.

3. **Rotate** camera housing back cover to open position by removing bolts with flat washers (20 pl). **Retain** bolts/washers for reinstallation.
4. **Disconnect:**
 - Power cable
 - Pan & Tilt cable
 - Controller cable
 - OTV Coaxial cable
5. **Unlock** spring pin at lower, left to release IR Camera Unit in camera housing. **Remove** IR Camera Unit from camera housing by carefully sliding it out the back opening of the camera housing. **Support** IR Camera Unit during removal.
6. **Rotate** camera housing back cover into closed position. Do not pinch cables. **Secure** back cover by reinstalling bolts/flat washers (20 pl). **Tighten** bolts wrench tight.



AUG 22 '01

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 6/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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2/9/01



United Space Alliance

TOPWAD Deviation

Dev No. 140.02 DILS No. 89334(5) Page 3 of 5

TOPWAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- Effectivity: <input type="checkbox"/> ORB /FLT	<input type="checkbox"/> ET	<input type="checkbox"/> GSE	<input checked="" type="checkbox"/> STS-104	
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP	<input type="checkbox"/> Design Req'ts	<input type="checkbox"/> Haz Step(s)	<input type="checkbox"/> PPE	<input checked="" type="checkbox"/> Internal Review Req.
Contractor OPR <i>R. Seale Firm 6/27/01</i>	Contractor Test Conductor <i>TO 27 6-28-01</i>	Gov't OPR <i>[Signature]</i>	Gov't Project Engineer <i>[Signature]</i>	
Contractor Test Project Engineer	Other	Gov't Test Director or Contractor Chief TC <i>[Signature]</i>		
Contractor Safety <i>R. Sealey 28 Jun. 01</i>	Other <i>[Signature]</i>	6-27-01		

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Insure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain, eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear solvex gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 04-13-01

- Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl Alcohol.
- Route IR Camera Unit to VAB 3K1 for refurb/checkout.

NASA PH-H: N/A Date: N/A
 USA ETM: N/A Date: N/A

NOT PERFORMED

ET 01

8/9/01

SPC 151
AUG 22 '01

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 6/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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8/9/01 ET 01

R. Seale Firm 8/9/01
SEE P+I CHANGE RECORD

Dev No. <u>140.02</u>	DILS No. <u>84334(9)</u>	Page 4 of 5
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TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-104	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <u>R. Seale ETM 6/27/01</u>	Contractor Test Conductor <u>T027 6-28-01</u>	Gov't OPR <u>[Signature]</u>	Gov't Project Engineer <u>[Signature]</u>	
Contractor Test Project Engineer	Other	Gov't Test Director or Contractor Chief TC <u>[Signature]</u>		
Contractor Safety <u>R. Seale 28 Jun. 01</u>	Other <u>SE Check</u>	Gov't Test Director or Contractor Chief TC <u>[Signature]</u>		

SEE PFI CHANGE RECORD
① R. Seale ETM 6/27/01

141-2
111
①

Remove IR Camera from Camera Site 2 as follows:

- Remove** bolt(s) from camera housing front. **Retain** bolt(s) for reinstallation when front cover is installed.
- Install** camera housing front cover using previously removed bolt(s). **Torque** bolt(s) wrench tight.

WARNING

Power cable is live. Care should be exercised when disconnecting power cable to avoid electric shock.

CAUTION

Do NOT allow back cover to exert undue force on cables when opening/rotating back over.

- Loosen** screws (8 pl) securing camera housing back cover using Phillips screwdriver. **Rotate** camera housing back cover to open position. **Retain** bolts/washers for reinstallation.
- Disconnect:**
 - Power cable
 - Pan & Tilt cable
 - Controller cable (2 pl)
 - OTV Coaxial cable
- Unscrew** set screw(s) at lower, left/right to release IR Camera Unit in camera housing. **Remove** IR Camera Unit from camera housing by carefully sliding it out the back opening of the camera housing. **Support** IR Camera Unit during removal.

SPC 151

AUG 22 '01

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 6/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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8/9/01 **ET 01**

Dev No. 140.02 DILS No. 89334(5) Page 5 of 5

TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-104	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale ETM 6/27/01</i>	Contractor Test Conductor <i>TO 27 6-28-01</i>	Gov't OPR <i>PH-HL 6-28-01</i>		
Contractor Test Project Engineer	Other	Gov't Project Engineer		
Contractor Safety <i>HL Sealey 28 Jun. 01</i>	Other <i>Richards SRcheck 6-27-01</i>	Gov't Test Director or Contractor Chief TC		

- Coat camera housing back cover O-ring with a single coat of (1) tube /jar 6505-00-133-8025 Petrofeum Jelly, Vaseline (or equivalent).
- Rotate camera housing back cover into closed position. Do not pinch cables. Secure back cover by installing screws (8 pl). Tighten screws wrench tight using Phillips screwdriver.

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Insure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain, eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear solvex gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 04-13-01

- Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymplé cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl Alcohol.
- Route IR Camera Unit to VAB 3K1 for refurb/checkout.

NASA PH-H: N/A Date: N/A
USA ETM: N/A Date: N/A

NOT PERFORMED ET
01
8/9/01

Reason: Establish operational controls for removal of IR Camera units from the RSS Roof and Camera Site 2.

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 6/27/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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8/9/01 ET
01

SEE PFI CHANGE RECORD
R. Seale ETM 8/9/01



TOP/WAD Deviation

Dev No. <u>150-01</u>	DILS No. <u>87036^(S)</u>	Page 1 of 1
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TOP/WAD No. S6444	REV/CHG/VER J01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 30
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First Use SRB BI- ET GSE STS-100
 Effectivity: ORB /FLT FRCS/POD /FLT SSME /FLT

Affected: OMRS/ACOMC/OMP Design Req'ts Haz Step(s) PPE Intergral Review Req.

Contractor OPR <i>R. Seale</i> <i>4/5/01</i>	Contractor Test Conductor <i>Jim Taylor</i> <i>4/9/01</i>	Gov't OPR <i>PH-12</i>
Contractor Test Project Engineer <i>Calley</i> <i>4/9/01</i>	Other <i>Mark Wollan</i> <i>4/5/01</i>	Gov't Project Engineer <i>PH-12</i>
Contractor Safety	Other	Gov't Test Director or Contractor Chief TC <i>Stephen</i> <i>4/9/01</i>

Page Number: 140-1 (s/b 150-1) Step Number: 150-2

Delete following from step 150-2:

“OMRSD S00U00.011-1”

Reason: OMRSD S00U00.011-1 pertains to Film Review (Operation 140).

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 4/5/01	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

8/13/01



TCN: 2868276

TOP/WAD Deviation

Dev No. <u>40-01</u>	DILS No. <u>9071(s)</u>	Page 1 of 2
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TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family <input type="checkbox"/> NMA	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-105	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale ETM 8/1/01</i>	Contractor Test Conductor		Gov't OPR <i>PH-HZ</i>	
Contractor Test Project Engineer	Other <i>EE Check</i> <i>PH-HZ 8/1/01</i>		Gov't Project Engineer	
Contractor Safety	Other		Gov't Test Director or Contractor Chief TC	

Page Number: 40-1 Step Number: 40-1

Change step 40-1 to read as follows:

40-1 Configure laptop computer to perform digital image processing, analysis, and recording as follows:

1. **Connect** following:
 - power cable to laptop computer
 - "Dazzle" capture card to laptop parallel port
 - "Y" adapter to laptop PS2 port
 - keyboard to keyboard port on "Y" adapter
 - mouse to mouse port on "Y" adapter
 - monitor to laptop
2. **Insert** Xircon Network Card into Personal Computer PCMCIA port.
3. **Connect** ethernet (gray) cord to Xircon Network Card.
4. **Remove** terminator from video cable.
5. **Plug** BNC-to-RCA adapter into end of video cable.
6. **Plug** video cable into "Dazzle" DVC "video in".
7. **Power-up** Trouble Console VCR.

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 8/1/01	<input type="checkbox"/> Perm <input checked="" type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

8/2/01



TOP/WAD Deviation

Dev No. 40-01 DILS No. 00271(5) Page 2 of 2

TOP/WAD No. S6444	REV/CHG/VER J 01	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family <input type="checkbox"/> NMA	Cause Code Org (B,O,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-105	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input type="checkbox"/> Internal Review Req.				
Contractor OBR <i>R. Seale ETM 8/1/01</i>	Contractor Test Conductor	Gov't OBR <i>PA-HZ</i> <i>Robert Thomas 8-6-01</i>		
Contractor Test Project Engineer	Other <i>W. L. ... 8/1/01</i>	Gov't Project Engineer		
Contractor Safety	Other	Gov't Test Director or Contractor Chief TC		

- 8. Log-on to KSC Ground Ops.
- 9. Click-on Start/Programs/Dazzle.
- 10. Confirm as operational and record results.

Results: **FUNCTIONAL**

ETM: *W. L. ... 8/8/01*
W. M. Richards II

Reason: Utilize capability to record video (i.e., OTV cameras) in digital format.

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 8/1/01	<input type="checkbox"/> Perm <input checked="" type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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ET
01

8/8/01

ID NO./REVISION		EFFECTIVITY	
S6444 J01		STS-105 (RUN 1)	
PAGE	SEQ/OP-STEP	CHANGE	APPROVAL QE/ENG
DEV 100-02 Pg 4/5	11-2	CORRECTED STEP NUMBER WAS: 11-1 IS: 11-2	D. Seale ETM 7/10/01
DEV 140-02 Pg 1/5	14-1	CORRECTED STEP NUMBER WAS: 11-1 IS: 14-1	D. Seale ETM 8/9/01
DEV 140-02 Pg 1/5	141-1	ADDED NOTE FOR NOT PERFORM QUALIFIER	D. Seale ETM 8/9/01
DEV 140-02 Pg 3/5	141-1	ADDED "NOT PERFORMED"	D. Seale ETM 8/9/01
DEV 140-02 Pg 4/5	141-2	CORRECTED STEP NUMBER WAS: 11-1 IS: 141-2	D. Seale ETM 8/9/01
DEV 140-02 Pg 5/5	141-2	ADDED "NOT PERFORMED"	D. Seale ETM 8/9/01
80-7	80-2	ADDED NOTE (FOR QUALIFIER) AND NOT PERFORMED BY FOR S/S 1	D. Seale ETM 8/16/01

ET
01

8/17/01